Report of the Director for the Session 1955-56

Staff

Professor V. G. Childe having intimated his desire to resign from the end of the present Session from the posts of Director and Professor of Prehistoric European Archaeology, the Senate appointed Mr. W. F. Grimes, C.B.E., M.A., F.S.A., F.M.A., Director, conferring on him the title of Professor of Archaeology in the University of London, and appointed Mr. J. D. Evans, M.A., to be Professor of Prehistoric European Archaeology. The Senate conferred upon Professor Childe the title of Professor Emeritus of Prehistoric European Archaeology in the University of London in recognition and appreciation of his distinguished service to the University and to his subject.

Professor Childe was given leave of absence to visit Romania for a fortnight in the Autumn Term, where he lectured in Bucharest and Iaşi, saw the latest results of excavation on Romanian sites, and re-established archaeological relations with a European country that has been peculiarly isolated since 1945.

Leave of absence for the Spring and Summer Terms was granted to Professor Codrington to enable him to undertake an archaeological reconnaissance in Nepal. Professor Codrington left at the end of December and no reports have been received on his activities, and it is understood that he will return early in the Autumn Term.

For the Spring Term leave of absence was again granted to Dr. Kathleen Kenyon to enable her to continue her excavations at Jericho on behalf of the British School of Archaeology in Jerusalem. The results of this season's operations have been as rewarding as those of previous years and have unexpectedly enriched our appreciation of the site's importance and of the life of early farming communities.

Leave of absence during the early summer was granted to Miss du Plat Taylor to enable her, in conjunction with Miss V. Seton-Williams, to conduct

an archaeological reconnaissance in North Syria with the assistance of the Wenner-Gren Foundation. Trial excavations enabled the expedition to identify the citadel at Tell Rif'at with a surrounding town.

Leave of absence was granted Miss M. M. Howard during the spring to assist Professor Mallowan in the conservation of the Nimrud ivories; she was also able to assist in the conservation of another unexpected and sensational find—another set of bronze gates at Balawat.

Mr. M. B. Cookson was granted leave of absence to assist at the excavations and training school at St. Albans.

During the summer Professor Zeuner and Dr. Cornwall continued excavations at Tor Bryan in Devon, at which many students of the Institute assisted. A Mesolithic horizon sealed under Bronze Age or later remains was identified and is believed to overlie immediately Upper Palaeolithic occupation layers.

In the Department of Environmental Archaeology, Mrs. Vera Smith resigned her post as Assistant to Professor Zeuner at the Royal Institution, and Mr. D. E. Vaughan has been appointed in her place. Work on radiocarbon dating has been accelerated following a reconstruction of the apparatus, and attention has been concentrated on the material from Jericho and the monastery of Khirbet Qumran.

To the regret of the whole staff, Mrs. Ida Sharp (née Champagne) retired from service at the Institute as from May 10th, 1956; she was replaced as principal administrative clerk by Miss Jennifer Banham.

The Director of the Institute of Archaeology, together with the Director of the Institute of Classical Studies, agreed to recommend to the Management Committees of their respective Institutes that Mr. C. H. Dance be appointed caretaker of the new Institute building in Gordon Square, and this recommendation has been approved on behalf of the Management Committee by the Chairman.

Teaching and Research

Excursions. In addition to routine lecture classes, excursions were arranged by the several departments to the following sites:

Bignor, Barkhail, Stane Street, The Trundle, Chichester Museum and city wall. (Prehistoric European and Roman Departments.)

Avebury, West Kennet, Windmill Hill, Devizes Museum, Barbury Castle, etc. (Prehistoric European Department).

Swanscombe, Ebbsfleet, Lullingstone, Brighton, Jevington, Wilmington. (Environmental Department.)

Lullingstone (Photographic Department).

Public Lectures. The Director gave two public lectures on "Recent Archaeological Discoveries in Bulgaria" at 8.15 p.m. in the Autumn Term, to audiences of from twenty-eight to forty-nine persons, and in the Summer Term delivered a course of seven lectures on "The Dawn of European Civilisation—Thirty Years After," on Tuesdays from May 1st to June 12th, for which audiences varied from sixty to sixty-six. In addition a special lecture was arranged for Friday, May 4th, at 5.15 p.m., when Dr. Neustupny of the National Museum, Prague, spoke on "Opinions Nouvelles sur le Néolithique Tchecoslovaque." Finally, the University Lectures in Archaeology on "Ancient Khorasmia," by Professor S. P. Tolstov, Director of the Institute of Ethnography of the Academy of Sciences of the U.S.S.R., were delivered at the Institute on March 13th, 15th and 16th, having been postponed from the previous week; attendances varied from twenty-four to forty-four.

Though the Institute as such does not organise Extra-Mural classes, it has been giving increasing assistance to the Extra-Mural Department of the University; for in recent years the demand for such classes in archaeology has enormously increased, and the University has established an Extra-Mural Diploma in the subject, the regulations and syllabus for which had been drawn up with the advice of Professors Childe, Wheeler and Zeuner. Many of the Tutors are drawn from the staff and students of the Institute, and most are individual members of the Institute. These Tutors have drawn on the Institute's slide collection for their lectures, while the Institute has loaned negatives to the Department in connection with the building up of a Departmental collection of slides. Tutors regularly bring their classes to the Institute on Saturday afternoons when the classes are not too far from London, and the Management Committee has recently sanctioned a scheme for allowing Extra-Mural students registered for the Extra-Mural Diploma access to the collections and use of the Institute's library. Specimens are also loaned from the Institute's collections for demonstration to such classes by Tutors who are members of the Institute staff.

In connection with the Conference on the relevance of archaeology to the teaching of history in schools organised by the Ministry of Education, the Institute's collections of Roman pottery were thrown open to those attending the course, and a morning session of lectures was held at the Institute. In addition, the Institute provided the Director, photographer, technical assistant, and several supervisors, for the excavation training school at St. Albans, to which the above-mentioned teachers and others were sent.

Students

The total number of students registered at the Institute during the Session was 82; besides these, 35 Intercollegiate students attended courses. Of those

registered at the Institute, 12 were registered for Diplomas, 20 for Higher Degrees, 2 for special research under Statute 21(iii) (1 part-time and 1 full-time) and 6 as full-time Technical Students, while 40 Occasional Students have been attending lectures and using the facilities of the Institute and 2 students have attended full Diploma courses as full-time Occasional Students.

For the Diploma in European Archaeology, Section A, 1 full-time and 3 part-time students have been working at the Institute; for Section B, 2 full-time and 4 part-time; and for the Diploma in Prehistoric Archaeology, 1 full-time and 1 part-time.

Of the 20 students registered for Higher Degrees, 5 were registered for the Ph.D. full-time and 4 part-time, 8 were registered for the M.A. full-time and 2 part-time, and 1 for the M.Sc. full-time. Of the foregoing, Miss Isobel Smith was awarded the Ph.D. for her thesis on "The Decorative Art of Neolithic Ceramics in South-East England and its Relations" and Mrs. Bridget Allchin was awarded the Ph.D. for her thesis on "Blade and Geometric Industries of Australia, Southern Africa and India." One student from Jordan with a scholarship partly provided by the British Council, Mr. A. Dajani, has been working at the Institute for the Ph.D. Degree, and one Fulbright scholar, Mr. E. H. Swanson, was registered as a full-time research student in the Environmental Department under Statute 21(iii). Dr. O. Ramachandraiya was registered as a full-time Occasional Student, taking the course prescribed for the Diploma in Prehistoric Archaeology, having been sent over for special training by the Government of India, and Mr. S. Owusu was sent over by the University College of Achimota, Gold Coast, for a year's study in general archaeology and to take the Technical Course at the Institute. Among the students registered at the Institute were the following from other countries: 1 from Australia, 1 from Austria, 2 from Canada, 1 from the Gold Coast, 1 from India, 1 from Japan, 1 from Jordan, 2 from Pakistan, 1 from South Africa, and 4 from the U.S.A.

Collections

During the Session gaps in the collections have been filled by specimens of Bronze Age and Early Iron Age pottery from Wiltshire obtained by exchange from the Wiltshire Archaeological and Natural History Society's Museum in Devizes; specimens of Belgian Neolithic pottery were obtained in the same way from the Musées Royaux d'Art et d'Histoire, Parc du Cinquantenaire, Brussels.

Publications

The Twelfth Annual Report of the Institute of Archaeology was delayed as a result of the dispute in the printing trade.

LIBRARY REPORT 1955-56

THE use of the Library by students remained the same as last year.

Due to rising costs a much smaller number of books could be purchased and there was also a considerable decrease in volumes bound.

With the introduction of the Extra-Mural Diploma in Archaeology, much greater use was made of the slide collection by student and staff lecturers at the Institute, and the figures exceed by nearly 1,700 all previous years' loans.

During the Summer term the Librarian was granted an extension of leave to take part in the Institute's excavations at Tell Rif'at, Syria. Miss Ellen Macnamara was again employed part-time during the Librarian's absence to assist with lantern slides. Mr. J. Butler also assisted in keeping the Library open.

Volumes added to the Library	294	Volumes bound	221
By purchase	114	Volumes lent	2,682
Presented	130	Highest month: October	360
Exchanged	50	Lowest month: September	102
Pamphlets added to the Library	206	Volumes borrowed from outside libraries	74
By purchase	12	Volumes lent to outside libraries	21
Presented	191	Lantern slides added to the Library	1,007
Exchanged	3	Lantern slides lent	6,724
Periodicals added to the Library	235		

The following have presented books, periodicals and lantern slides to the Library:

Algeria, Direction de l'Interieur et des Beaux Arts; Dr. R. Allchin; E. Amati; Mrs. Amiran; A. ApSimon; A. J. Arkell; P. Ashbee; British Archaeological Association; J. J. Butler; Professor V. G. Childe; J. D. Clark; Dr. P. Corder; Dr. I. W. Cornwall; Mrs. Cotton; M. Dothan; Victor Ehrenberg; Per Fett; Dr. Henry Field; Miss I. Gedye; Dr. H. Godwin; R. D. Greenaway; Ludwig Gruber; Elsbeth Hinrichs; Erik Hinsch; H. W. M. Hodges; Indian Government, Department of Archaeology; International Wool Secretariat; Institute of Historical Research; Dr. B. S. J. Isserlin; Dr. K. M. Kenyon; J. H. C. Kern; Kyusho University; London School of Economics Library; London University, Goldsmiths' Librarian; J. L. Lorenzo; T. G. Manby; Col. G. W. Meates; Midland Silicones Ltd.; Dr. Jiri Neustupny; Dr. K. P. Oakley; Philadelphia University; E. Pyddoke; Revertex Ltd.; Royal Archaeological Institute; School of Oriental and African Studies; E. Schwarzenberg; Servicos Geologicos de Portugal; Dr. P. L. Shinnie; Dr. I. F. Smith; Society of Antiquaries of London; Spink & Son; Dr. B. Subbarao; Professor T. Sulimirski;

R. Summers; Miss J. du Plat Taylor; Mrs. Terry; A. C. Thomas; Mrs. Topp; Miss O. Tufnell; Dr. J. Waechter; F. T. Wainwright; Wellcome-Marston Archaeological Research Expedition to the Near East; Sir Mortimer Wheeler; E. S. Wood; Professor Wooldridge.

REPORT OF THE TECHNICAL DEPARTMENT

TWENTY-TWO students have been working in the department, six full-time and seven part-time students following the Technical course, eight students taking courses for Diplomas and Higher Degrees, and one doing work as an intercollegiate student.

Work was carried out for the museums at Alton (Curtis), Aylesbury, Dartford, Devizes, Dorchester, Helston, and Oxford (Ashmolean), and for expeditions which had been excavating at Canterbury, Lakish, Nimrud, and in Cyprus. Of particular interest was a small bronze-bound wooden bucket of the Saxon period which was treated and reconstructed for Dartford Museum.

Models of Pleistocene mammalia were prepared for the following museums: Dartford, Halifax, Letchworth, Norwich, Nottingham, Torquay, Woolwich, and the National Museum of Wales. A copy of the Institute's diorama depicting a scene on the banks of the Thames at Swanscombe in Acheulean and Clactonian times was made for the Windsor Guildhall Exhibition; Fibrenyle dough (nylon fibres in plastic) was used for the groundwork instead of Plaster of Paris, making the diorama much lighter as well as stronger than the original. Three new models were completed under the direction of Professor Zeuner: the cave hyena, *Crocuta crocuta*, the onager, *Equus hemionus*, and the southern elephant, *Elephas meridionalis*.

Once again Mr. C. D. P. Nicholson gave two lectures on the care and preservation of Roman mosaic floors and painted wall plaster; Mr. A. M. Christie gave a lecture on the use of rubber latex in lifting mosaic floors. Special visits were made to the British Museum (Natural History), the Courtauld Institute of Fine Art, the London Museum, and the Ministry of Works laboratory, where members of the staff gave lectures and demonstrations.

Several of the full-time Technical students offered to work voluntarily at Gunnersbury Park Museum, which is in course of rearrangement, and gained useful experience in many aspects of museum work.

Mr. A. S. Trotman, a former student of the Department, obtained the Technical Diploma of the Museums Association with Distinction; Miss Norma Stone and Mr. Terence Manby obtained posts as Technical Assistants in the Derbyshire Education Committee's Museum Service; and Mr. Roderick Cowlin obtained a two-year Traineeship in the Department of Archaeology at the Birmingham Museum and Art Gallery.

REPORT OF THE PHOTOGRAPHIC DEPARTMENT

FURTHER additional time was devoted to teaching during this Session. The fact that the student darkroom was used nearly one hundred times is an indication of growing practical activity.

Two Societies visited the Department, and the Instructor, as in previous years, has given a number of outside lectures on photography in relation to archaeology. He also lectured on the Extra-Mural Course at Ambresbury Banks, Essex.

A colour film on the technique of lifting finely decorated wall plaster, made during the 1955–56 season at Verulamium, has been added to the Institute's collection of teaching films.

An all-metal enlarger with cold cathode lighting has been added to the Department's equipment.

The Prehistoric Cultures and Primitive Irrigation Systems of Ancient Chorasmia

By S. P. Tolstov

We publish here the second of the three University Lectures in Archaeology delivered in 1956 by Professor S. P. Tolstov, Director of the Institute of Ethnography of the Academy of Sciences of the U.S.S.R., on "Ancient Chorasmia" in the light of the expedition of the Academy of Sciences of the U.S.S.R. that he has directed since 1937. The first lecture dealing with the history of Soviet explorations in Central Asia and the early hydrography of the area will be published elsewhere, but for the appreciation of the second it is necessary to summarise certain conclusions explained in the first.

Chorasmia was the region watered by the Lower Oxus, now the Amu Darya which now debouches into the Aral Sea. In prehistoric times, however, the river flowed eastwards along the course now represented by the bed of the Akcha Darya into which were discharged also some of the waters of the Jaxartes (Syr Darya) (Fig. 1).

In the same period (Neolithic and Bronze Age) some waters of the Amu Darya flowed into Sarykamish depression and then through the valley of the Uzboy into the Caspian Sea.

Neolithic Chorasmia

Since 1937 our expedition has been devoted in the first place to the Akcha Darya delta, and only in 1954 could we embark upon the study of the Akcha Darya corridor and the northern delta; so it is only now that we are able to present a comprehensive though far from exhaustive account of the archaeological remains of that delta.

The Neolithic population of the Akcha Darya delta is represented by the so-called Kelteminar culture which was first identified at the site of Dzhanbas-Kala (Fig. 2) discovered in 1939, four kilometres south of the substantial ridges within the delta, and is now known by twenty-five sites scattered all along the bed of the Akcha Darya. I have already described the Kelteminar culture ("The Early Culture of Khwarizm," *Antiquity*, XX, 1946, pp. 92–9). Suffice it here to say, therefore, that the Dzhanbas 4 site, still the type station, was the remains of

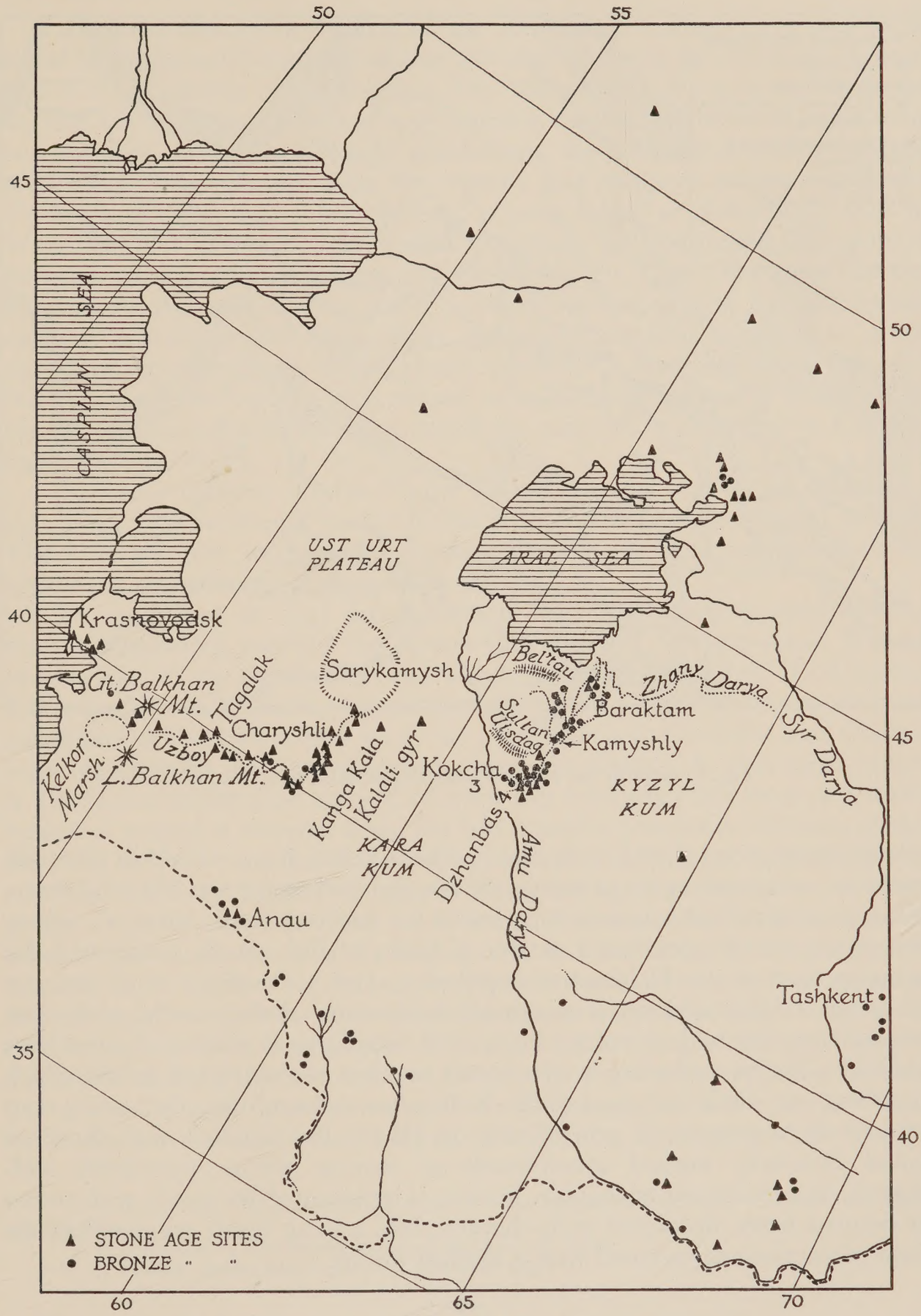


Fig. 1. Map of the region

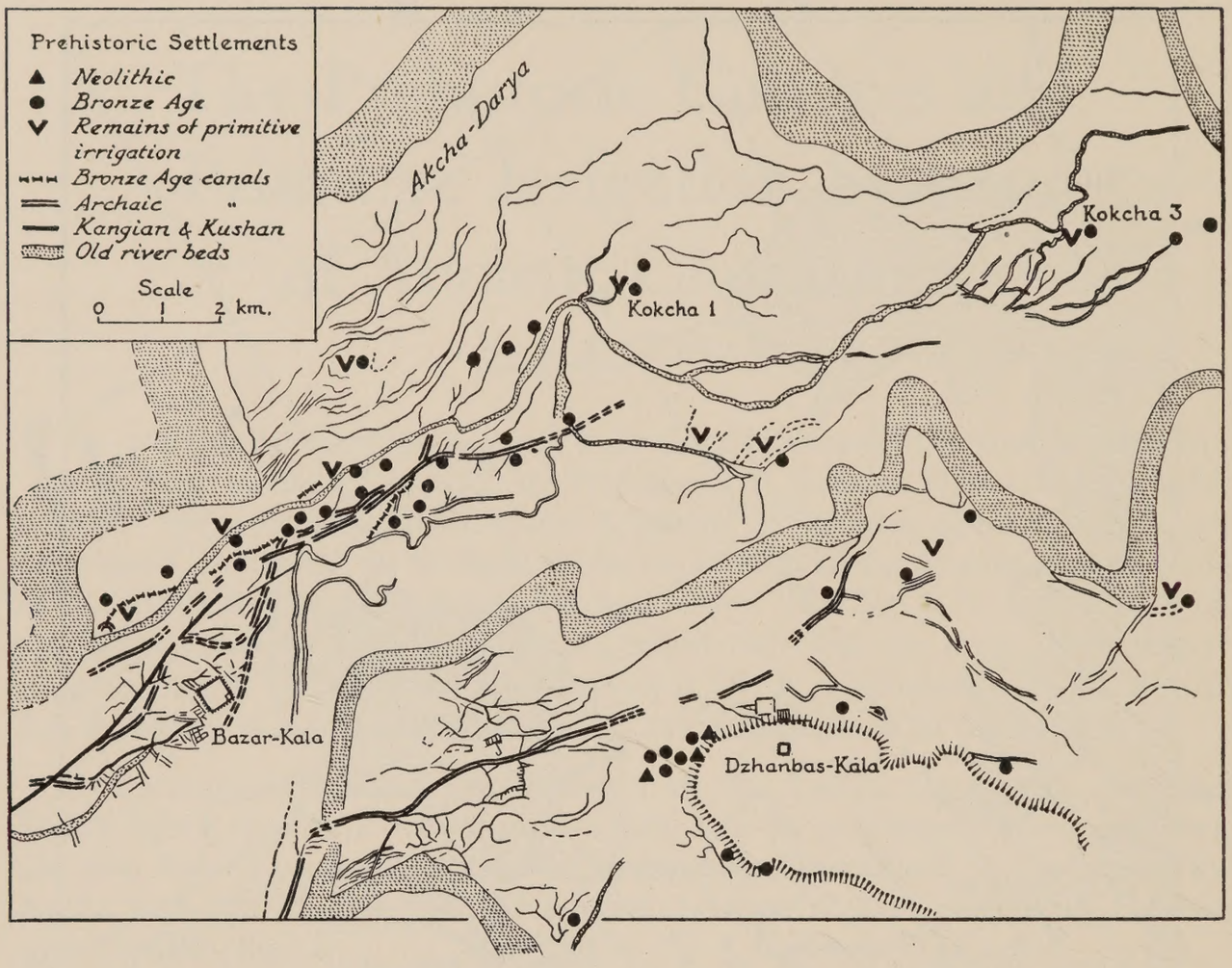


Fig. 2. Sites in the south Akcha Darya delta and channels

a large house of wood and reeds that had been burnt down. Ovoid in plan, the enclosure measured 24 by 30 metres; it was situated on the top of a sand-dune. Near the centre was a hearth surrounded by two concentric rings of cooking fires, near which were found masses of bones of fish, which constituted the primary food of the Kelteminar population, and a relatively small number of bones of birds and small mammals, fresh-water shells, sherds, and stone implements. The majority of the flints were microlithic in character; most were knife-like blades, including a substantial number of shouldered points which represent one distinctive type of the Kelteminar culture, the other being constituted by asymmetrical arrow-heads on blades. But together with these we found bifacially worked arrow-heads of various forms—rhomboid, leaf-shaped, and elongated triangular. Pottery is represented by vessels with round or pointed bases, decorated with characteristic zig-zag comb ornament in the form of impressions executed with a toothed stamp.

All these distinctive features of the Kelteminar culture have now been found throughout Chorasmia, and we are able to detect provisionally chronological modifications of that culture. The Dzhanbas 4 site is one of the most ancient. Other sites may be variously dated in the third millennium down to its last centuries. As we have already pointed out, the Kelteminar culture exhibits similarities with remains from the eastern and southern ridges round the Urals. A. A. Formozov[1] has detected a wide range of Kelteminar sites in Western Kazakhstan. Recently V. N. Chernetzov[2] has established close contact between the Kelteminar culture and remains in the West Ob basin. The site near the Andreyevsk lake has many points of agreement with the Kelteminar culture; and sites in the Kama basin, particularly that at Levshinska[3] at the mouth of the Chusovaya River, closely resemble Kelteminar sites—but only the later ones attributable to a period subsequent to Dzhanbas 4, that is to the end of the third millennium, to which the majority of the Western Kazakhstan sites also belong.

Neolithic cultures on the Upper Uzboy on the borders of Chorasmia should also be attributed to the Kelteminar culture, being its local version. The Uzboy region was densely populated in the Neolithic and Chalcolithic epochs—fourth to early second millennia B.C.

In the spring of 1951 an expedition along the Caspian coast starting from Krasnovodsk reached the Aktam channel and the salt-marsh Kelkor, once a lake, at the point where the Uzboy formerly flowed into the Caspian. The expedition also made a reconnaissance in the Great Balkhan mountains, and followed the Uzboy bed up to the Charyshli well. Neolithic and Chalcolithic monuments are very numerous along the Uzboy. At that time—down to the second millennium B.C.—the Uzboy was certainly a live river; the distribution of primitive remains along the bed provides conclusive evidence of this fact. On the lower reaches of the Uzboy the valley attains its maximum width and was evidently flooded in ancient times, forcing the population to retire to the original banks far from the channel. Elsewhere the Neolithic sites are located right on the banks of the former river and are concentrated in a narrow zone up to a couple of dozen metres from the bank. Flint implements are so densely scattered that for a considerable distance investigations at any point of the bank yielded implements. Relics were particularly abundant on the Aktam bed linking the former lake—now the Kelkor marsh—with the Balkhan bay of the Caspian, the north coast of the Kelkor marsh; and—on the Uzboy itself—the area between Kalan-Kuyu and Dekcha, the region of the Adzhi-

[1] A. A. Formozov, "Kelteminarskaya Kultura v Zapadnom Kazakhstane," *KSIIMK*, XXV, 1949, pp. 49–58.

[2] V. N. Chernetzov, *The Ancient History of the Lower Ob Valley.*

[3] S. P. Tolstov, *Ancient Khwarizm*, p. 63, Moscow, 1948.

Kuin bend and up-stream to the Tagalak district; and finally the upper reaches of the Uzboy from the Bala-Ishem district to Charyshli where the Uzboy debouches from the Sarykamish depression (Fig. 1).

Neolithic settlements were not restricted to the Uzboy bed. They are quite numerous in the zone of lakes formed by the overflowing of the Uzboy, and particularly around the ancient Uzboy lagoons in the neighbourhood of Kugunek mountain.

The observations of 1955 proved that the Uzboy remains can be divided into two groups. The first comprises the remains of the "Upper Uzboy culture," the leading types of which are asymmetrical arrow-heads on knife-like blades, scrapers on blades, knife-like scrapers, knife-like blades with blunted back, notched blades, and borers. These "Upper Uzboy" microliths are clearly just a variety of the Kelteminar types, and the region of the Kugunek mountains down to Kurtysh and the country round Orta-Kuyu and Yekidzh turned out to be the main centres of this "Upper Uzboy culture."

The second group is made up of the remains of the "Lower Uzboy culture." Its leading types are very steep sub-rectangular scrapers, smaller sub-triangular scrapers on flakes, and very archaic types of arrow-heads and spear-heads. With them there were also implements on blades. Very numerous sites of this culture were noted in the sands on both sides of the channel from Kalan-Kuyu to Tagalak; the most interesting sites, 110 and 114, which seem rather more archaic than the first, have been found in the latter district. Both are on the high left bank of the Uzboy: No. 110 is 20 metres from the steep bank of the river. Flints were collected in an area covering nearly 10 square metres sloping gently towards the river bed. The finds were situated on the burnt surface of the grey alluvial sand; some of the flints were covered over with this sand, even at depths of 5 to 10 cm.

Site 114 is close to the Tagalak well, where the Uzboy valley abruptly narrows to enter the Tagalak-Burgun gorge. Where the channel bends, the former bank slopes down gently. The implements were found scattered about in a large hollow blown out mid-way down the slope. Being made up for the most part of the same kind of flints and displaying a unity of form, they may be attributed to a single complex. More than 130 chips, 71 knife-shaped blades, and many implements have been found at the site, including 5 massive scrapers made on big flakes, 2 notched blades and 3 arrow-heads, one with trimmed edge, 4 cores and 2 fragments of cores. The scrapers are more massive than those found at site 110 and some preserve traces of cortex; some may be called steep. Attention should be drawn to a knife-shaped blade 7 cm. long and 1–3 cm. wide made of semi-transparent black obsidian imported from a distance: the nearest sources of such obsidian are to be found in Transcaucasia.

Pottery was found at both sites near Tagalak. Several sherds of a globular round-bottomed vessel about 35 cm. high were found at site 110—it recalls some forms found in Anau II. The sherds collected near the flints near site 114 are rather different: they include fragments of a greenish-grey thick-walled vessel, heavily tempered with shell; its surface bears traces of crude smoothing with bunches of grass. The rim is flat, ornamented with cross incisions on the edge, and recalls those from the fourth strata of Dzhebel cave.

From an analysis of the flints and pottery from the Uzboy Neolithic sites we may conclude that the Upper and Lower Uzboy respectively were colonised from different directions. Both regions were populated about the same time, and the colonisation was quite late from the geological standpoint—fourth to second millennium. The ancient Kelteminar tribes evidently moved in from the north, from the zone of lakes and flooding, to the region of the recently formed upper channel. The piedmont tribes, ancestral to the inhabitants of Anau, who brought the traditions of the Mazendaran culture identified by C. S. Coon in the Hotu cave[4] near Astrabad, spread from the south.

But while the Upper Uzboy group raises no problems, opinions as to the origin of the Lower Uzboy culture remain speculative, since the piedmont precursors of the Anau culture and the Neolithic of South Turkmenia and South-East Iran in general have received very little attention. The suggestion of southern relations may be justified not only by rather remote contacts with the flints from Hotu, but still more by the obsidian blade from Tagalak 114 and the globular vessel of Anau form at Tagalak 110.

In the Chalcolithic period—end of the third and beginning of the second millennia B.C.—the Kelteminar tradition, as shown for instance by asymmetrical arrow-heads on blades, spread to the Lower Uzboy region. Such were found by A. P. Okladnikov in a Neolithic cave on the south-west slope of the Great Balkhan mountain not far from the town of Dzhebel. Thus the Kelteminar culture spreading southwards covers a vast area of hunting and fishing tribes in the basins of rivers rising in the middle and southern Urals, and in the vast basin of the ancient lakes and the Amu Darya and Syr Darya channels up to the Lower Uzboy. Most sites have been found in Chorasmia, but in my opinion much additional information is to be expected from investigations in the regions lying to the south, notably in the almost unexplored area of the Ungùz depression which crosses the Kara-Kum desert transversely and divides it into the Low and the Zaunguss Kara-Kum. It is to be regretted that we know so little of the Neolithic remains of Iran, Baluchistan and Western Afghanistan, as well as of the vast Indian peninsula. Until we have fresh data from these areas we cannot expect a final solution to the problems of the origin of the

[4] C. S. Coon, "Excavations of Hotu Cave," Iran, 1951; L. B. Dupree, "The Pleistocene Artifacts of Hotu Cave," Iran, *Proceedings of the American Philosophical Society*, 96, No. 3, June 1952.

Kelteminar culture. But, as I have already argued in my *Ancient Khwarizm* and *Following the Trails of Ancient Khwarizm Civilization*, it is precisely in the Kelteminar culture that we should expect to find an explanation for the lexical agreement between the pre-Indo-European languages of India (Dravidian and Munda) and Finno-Ugrian.

Up to date we have no anthropological material referable to the Chorasmian Neolithic, but, as will appear below, the Bronze Age burial ground of Kokcha 3 justifies the conclusion that by the end of the second millennium B.C. the Chorasmian population included a prognathous type evidently connected with the Indian Dravidoids, which perhaps should be traced back to the Kelteminar stage of the "Lower Uzboy culture."

In the Akcha Darya delta Kelteminar sites were normally located on the edge of the delta and of the original sands outside the area of the immediate inundation, or on the spurs of the large ridges or islets within the delta, e.g. the Dzhanbas-Kala sites. Neolithic sites are not as a rule to be found within the delta proper or on the *taqyrs*[5] of the main and lateral river beds. This will be found to be a cardinal point of difference between the Neolithic and Bronze Age sites in the Akcha Darya delta. The factors enumerated indicate that in Neolithic times—fourth to third millennia—the Akcha Darya delta was still well-watered. This area was covered with swamps overgrown with close forest and reeds which abounded in wild animals, but it was an unsuitable region for human habitation, all the more so owing to the fluctuating levels of the water, for the delta regions were frequently flooded. So man, who was primarily still a hunter or fisher, was forced to move outside the delta itself, to the border of the Kzyl-Kum sands.

We know little about the post-Kelteminar forms of Chalcolithic culture. There are certain sites on the banks of the Amu Darya that may be dated to that period, but it is still impossible to say anything certain as to the age and local variations of Chalcolithic culture. On the other hand, monuments of the Bronze Age culture from the middle of the second millennium to the beginning of the first are very numerous, particularly in the Akcha Darya delta zone itself, where no less than sixty are known. The majority of these sites is located within the delta, on the *taqyr*-like loams, and close to the lateral channels; they are exceptionally numerous along the banks of small channels 10 metres or less wide. We have found no sites of the Bronze Age outside the delta on the original sands. This must be the result of two factors. On the one hand, the water supply of the upper delta was substantially reduced in the second half of the second to the beginning of the first millennium B.C. On the other hand (and this is the more decisive factor) fundamental changes took place in the mode of life and pro-

5 *Taqyr:* (the Turkish *takyr* = smooth and flat) a compact loam surface in deserts and semi-deserts of Central Asia, which is waterproof and cracks with heat into separate polyhedrons.

ductive activities of the delta's ancient population: hunters and fishers were replaced by primitive stock-breeders and cultivators.

Bronze Age Chorasmia

The first Bronze Age culture of Chorasmia, which we discovered as early as 1938, we styled the "Tazabagjab culture." For a long time the Tazabagjab material was virtually limited to pottery, collected from numerous weathered and eroded Tazabagjab sites. But even at that stage it was clear, as was pointed out in *Ancient Khwarizm*, that the Tazabagjab culture exhibits traits of close relationship with the Andronovo culture of the Kazakhstan and South Siberian

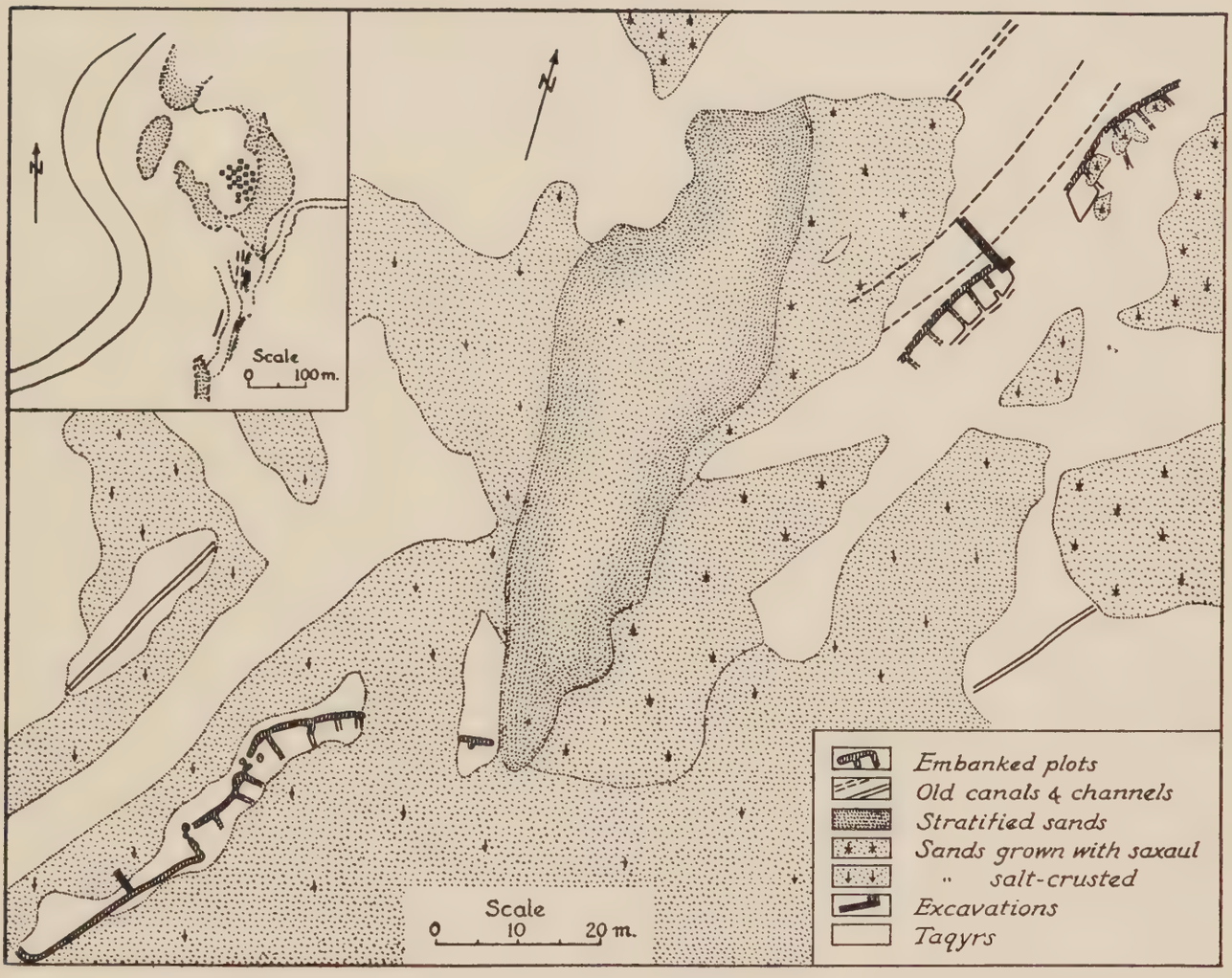


Fig. 3. Ancient irrigation works in the vicinity of Kokcha 3

steppes and in a lesser degree with the so-called Srubny culture of the Lower Volga regions.

In 1953 the first dwellings of the Tazabagjab epoch were discovered—at the Dingildzhe I and Angka V sites. The dwelling at the latter site was

particularly well preserved. It is a rectangular hut of 8 by 12 metres, half sunk in the ground with a narrow long entrance from one end opening towards the nearest arm of the river. This plan very closely resembles that characteristic of the recently discovered dwellings of the Andronovo and the Srubny cultures.

In 1954 we succeeded in discovering for the first time a big cemetery of late Tazabagjab culture, located 6 to 7 kilometres south-west of the Kokcha Mountain—the extreme eastern spur of the Sultan-Uizdag system. Close to this cemetery were found remains which, from available data, belong to a contemporary settlement (Fig. 2).

The burial ground (the excavation of which was supervised by M. A. Itina and myself) is located on a *taqyr* surrounded by low sands 1 to 2 metres in height, 300 metres north of one of the lateral beds of the Akcha Darya River. South of the Kokcha 3 settlement very interesting primitive fields are located (Fig. 3). It was precisely here, as we shall see below, that we succeeded in tracing the most ancient system of primitive artificial irrigation.

Traces of approximately one hundred graves were found on the above-mentioned *taqyr*. Further research showed that their number should be substantially increased since not all of them are visible from the surface. No traces of grave super-structures were detected. Consequently, we may deem it established that no masonry structures, such as are characteristic of many monuments of the Andronovo culture, were made by the people of Tazabagjab. The *taqyr* was subjected to denudation in the course of ages so that its surface was eroded. The consequent exposure of some of the graves drew our attention to the cemetery. Altogether seventy graves were excavated in 1954 and 1955. They were rectangular in form, in many cases almost square. The size of the larger graves varied between 2·2 by 1·8 and 1·98 by 1·4 metres. Smaller graves scarcely exceeding 1 metre square, as might have been expected, proved to contain children's remains. Some of the graves turned out to contain double burials of man and woman, placed in a contracted position—the man lying on his right side, the woman on her left, facing one another (Fig. 4). A few graves (four) contained two female skeletons facing one another or lying on the same side. Seventeen single burials were noted. Of greatest interest were the double burials of man and wife. It is established beyond doubt that they were not buried at the same time: the grave was prepared for two corpses but as a rule initially only one partner, man or woman, was placed there. Later, when the second died, the grave was re-opened and the person first buried, who had usually been placed closer to the centre than was convenient for a double burial, was moved aside and the second corpse deposited. This is clearly seen from the position of the bones of one of the skeletons and, in a number of cases, from the discovery of a second grave, usually deeper, which had been dug at the time of the second interment. All this proves that for the Tazabagjab

culture wife-slaughter and the supremacy of the recently introduced patriarchal system (which some scholars have been inclined to infer from double burials) were out of the question. I believe that this point should be checked in connection with double burials in other areas of the Bronze Age steppe culture.

By the head of the corpse invariably stood one or two vessels, apparently designed for food. However, no animal bones have been found, and tests for vegetable food have not yet yielded any results. As a result of the excavations

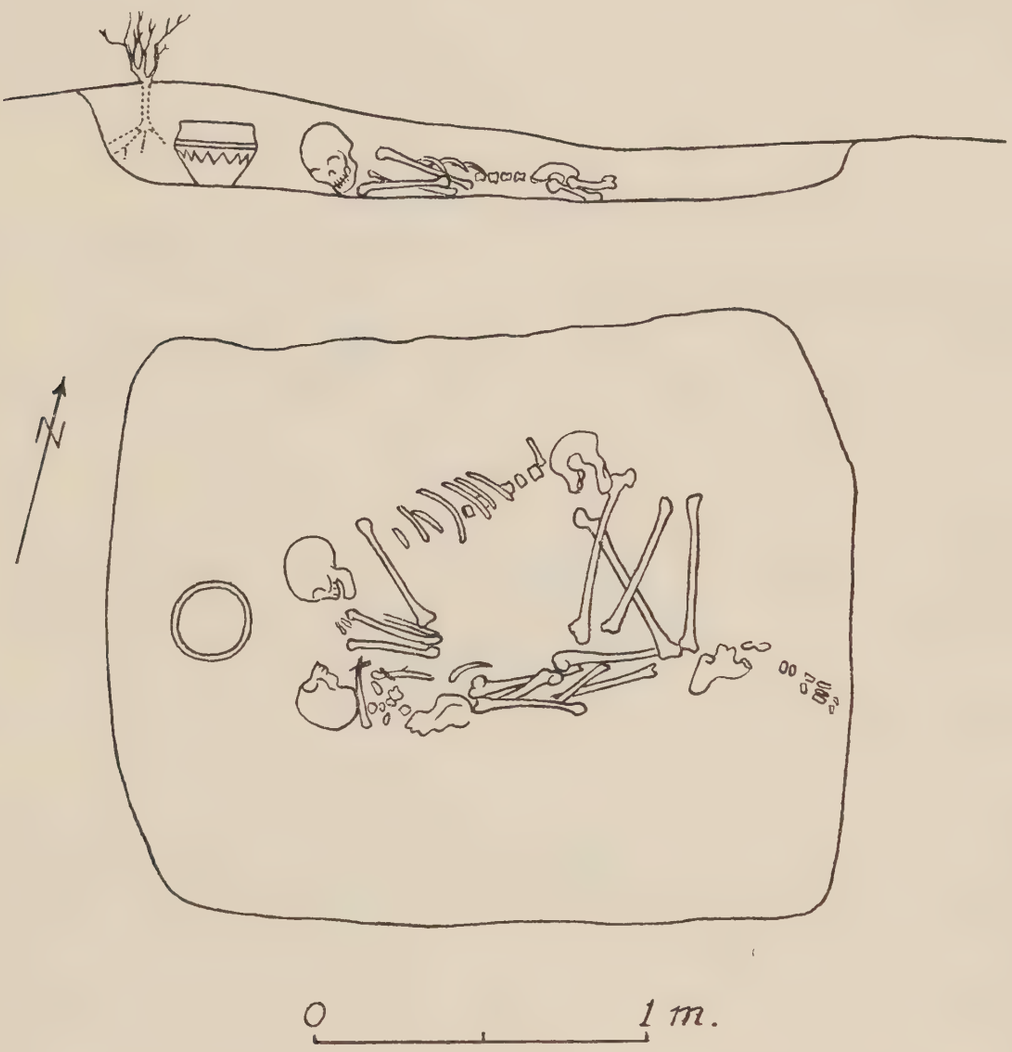


Fig. 4. Burial 24 at Kokcha 3 (based on *Vestnik Drevnei Istorii*, 1955, No. 6, Fig. 13)

(1954–55) we have a collection of seventy-six vessels which will provide the basis for a comprehensive study and a comparative analysis of the ceramic material.

Fig. 5. Pottery from graves of Kokcha 3 (based on *Vestnik Drevnei Istorii*, 1955, No. 6, Fig. 11)

The vessels illustrated in Fig. 5 show that the pottery from the Tazabagjab burials is, without doubt, closely related to the pottery of the Kazakhstan Andronovo culture; it is particularly close to the pottery of the Aleksyevsky cemetery and settlements investigated by O. A. Grakova. In addition, there is

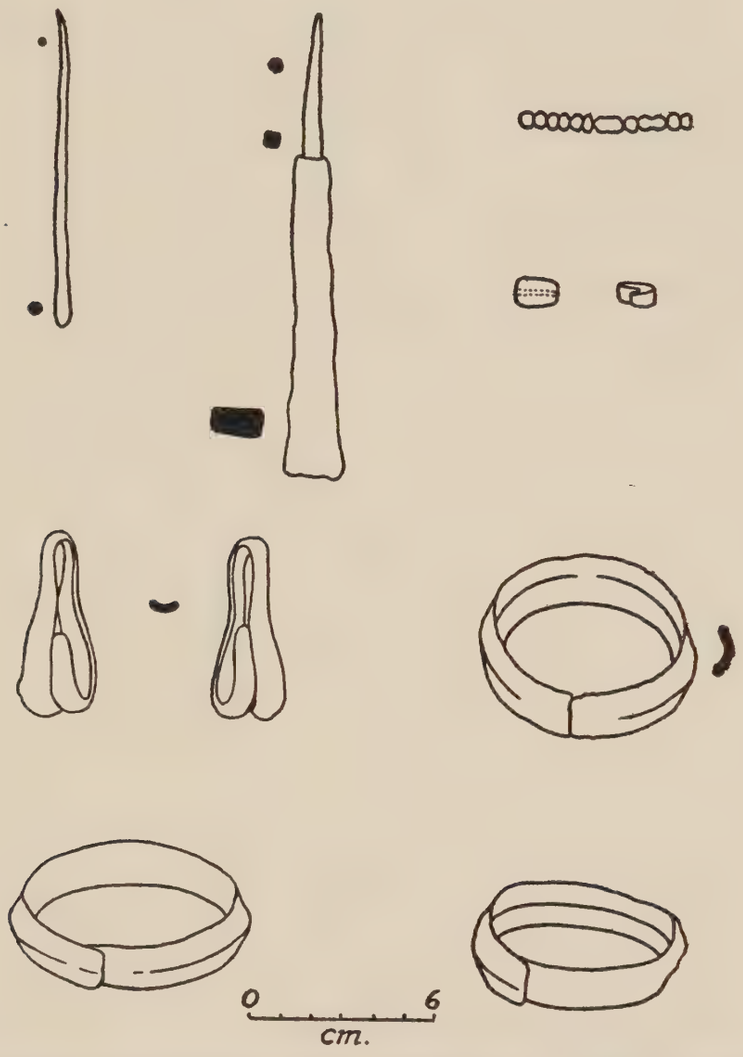


Fig. 6. Beads and bronze objects from graves at Kokcha 3 (based on *Vestnik Drevnei Istorii*, 1955, No. 6, Fig. 12)

a number of forms which disclose conspicuous points of similarity with the Srubny culture of the Volga region, while some of them allow us to infer connections with the Suyargan pottery of the Chorasmian Bronze Age to which we shall make further reference below. In any case, the predominant element in the forms of the pottery and in its ornamentation is indubitably that of Andronovo.

All female interments are accompanied by various ornaments—bronze bracelets, bronze ear-rings of the Srubny-Khvalynsk type, beads made of paste (faience) and stone (carnelian) (Fig. 6). The male burials, apart from the pots, are accompanied only by awls. A study of these bronze articles shows that though we find similar articles in the Andronovo graves of Western Kazakhstan, they are rather rare there. On the other hand, the ornaments worn by the Tazabagjab people show complete identity with those found in graves of the Srubny

cultures, and with the furniture from the barrows near Yagodnoye village in the Central Volga region, excavated by N. Y. Merpert.[6] Merpert points out that the ear-rings from the Yagodnoye barrow resemble some from the Stepanakertsky barrow in Azerbaijan, Transcaucasia.

Of no less interest is the craniological material found during the excavations of 1954 and studied by T. A. Trofimova. Twenty-six skulls found in 1955 are still in course of restoration. Those suitable for detailed study proved to be five male and seven female. The majority of the skulls are dolichocranial, low and broad-faced, some of them showing a substantial alviolar, and at times general, prognathism. Their measurements may be compared with both the Andronovo and the Srubny skulls, but differ from both in their small size, to say nothing of their substantial prognathism. The sum total of features resembles most closely the Bronze Age skulls of the southern areas of Central Asia[7] and the skulls of the early Neolithic "Mazenderan" culture (the Hotu cave, excavated by C. S. Coon). The prognathous skulls from Kokcha 3 particularly resemble the skull found in the early Neolithic layer in one of the Georgian caves. Certain skulls, characterised by orthognathism and large dimensions, clearly document the mixed nature of the Kokcha 3 population.

As a very provisional hypothesis I might once again recall the linguistic correspondences between North-Western Siberia and the Urals and the extreme south of India, and offer a hypothesis that the prognathous type of the population of Kokcha 3 might be a direct descendant of the Kelteminars, genetically associated with the ancient Indian Dravidoid population; while the admixture of the orthognathous Europeoid of Srubny-Andronovo type is associated with the expansion from the north of Indo-European steppe tribes of the Bronze Age. In any case, we can say that the material from the cemetery of Kokcha 3 proves that already at a remote period, Chorasmia—the ancient "Region of Great Lakes" of Central Asia—was a centre of extensive ethnic crossings.

All available evidence suggests that the cemetery should be dated to the 13th or the beginning of the 12th century B.C. The Kokcha 3 settlement which as already stated we consider to be contemporary, provides us with an entirely different group of pottery. This pottery resembles more closely the above-mentioned material of the Suyargan culture which we discovered in 1945 in the vicinity of Dzhanbas-Kala. This Suyargan pottery presents quite a complicated archaeological problem. While at the outset we thought of the Suyargan

[6] *MIA*, 42, 1954, "Materialy po arkheologii srednego, Zavolzhia," pp. 50–76.

[7] The skull from Tup-Khonq close to Gissar, excavated by N. M. Dyakonov; the skull from Zamqnbab Lake in the ancient dry bed of the Zeravshan-Makhan-Darya River, in the area of Karakul, excavated by Y. G. Gulyamov.

culture as a single unit persisting over a number of centuries, we now regard the question as much more complicated. The Suyargan culture is represented by some eroded sites, located in the same geographical environment as, and at times very close to, the Tazabagjab sites and settlements. Early sites of the Suyargan cultures are characterised by pottery practically devoid of stamped and hatched (incised) ornament but covered by a red, brown, or more rarely black slip which was subsequently polished. The forms and particularly the treatment of the surface of the vessels, justify a comparison with the pottery of the Anau cycle—especially with that of Anau III. Such ornamentation as appears on these vessels is very modest and is confined to a herring-bone band round the rim. The later sites are characterised by a greater diversity of form and display new features side by side with some elements of the tradition of earlier forms. The most important fact, however, is that both the early and the late pottery of the Suyargan culture is found in sites of the Tazabagjab culture. Thus at the early Tazabagjab site of Kokcha 2, which is dated to the 15th to 14th century B.C., among a substantial number of typically Tazabagjab sherds, in a freshly eroded ash stratum, we picked up fragments of an early Suyargan vessel. The cemetery and settlement of Kokcha also reveal a combination of late Suyargan and Tazabagjab elements. In still later Suyargan sites dating to the 10th or perhaps even to the 9th century B.C. (the Kaundy 1–2 and Bazar 1 sites), the Tazabagjab elements disappear almost completely, but new elements appear proving a new wave of steppe contacts. I have in mind bronze knives approximating to the Karasuk type found at these sites and vessels characteristic of the Karasuk culture.

As is well known, the Karasuk culture of the Late Bronze Age in Southern Siberia (Minusinsk territory, Altai and the Baikal regions) exhibits most intimate contacts with the contemporary culture of North China's border tribes which were exposed to a strong influence from the Yin (Shang) culture. S. V. Kiselev, who established this fact, attributes the appearance of the Karasuk culture to a migration of its authors from the south-east. This is confirmed by anthropological data presented by G. F. Debets, for the Karasuk type of the population reveals an unmistakable affinity with the contemporary population of Northern China. It may be inferred in this connection that the appearance in the late Suyargan culture of Karasuk elements, previously noted on Kazakh territory, and particularly in Eastern Kazakhstan, is connected with the migration of some ethnic elements from the east.

Hence we see that influences of various ethnic elements converged on Chorasmian territory in the Late Bronze Age. These elements include the southern (early Suyargan); the northern and the north-western, most likely Indo-European (Andronovo and Srubny elements in the Tazabagjab culture); and the eastern (Karasuk elements in the late Suyargan).

As we have pointed out, the Bronze Age monuments of Chorasmia are associated with primitive forms of irrigation-agriculture. In the area of the majority of Bronze Age sites, in the southern Akcha Darya delta (Fig. 2) we have discovered numerous traces of such irrigation works as were built on the small dwindling channels of the delta. The most primitive of these irrigation works is the type observed in the area of the Kokcha 3 site (Fig. 3) and in the area of the rather later site of Kokcha 1. Here the irrigation is based on a narrow dammed lateral channel of the delta in the immediate vicinity of which are the garden plots, which are almost square in form, 2·6 to 3·0 by 3·5 to 4·8 metres in area, surrounded by low dykes stretching along the embanked river bed. More developed irrigation works may be attributed to the late Suyargan period (end of the second millennium B.C.)—the Bazar 1 and Bazar 3 sites (Fig. 7). Here a small distributing canal, some scores of metres in length, has been constructed, branching from the lateral river bed to irrigate the adjacent fields. The irrigated plot at Bazar 3 was approximately one hectare in area. A more complicated system is encountered in the early Iron Age, in the so-called Amirabad culture of 9th to 8th century B.C., in the area near the Bazar 8 site. Here a number of parallel irrigation channels from the lateral dammed river-bed stretch for one kilometre, and from the canals in the lower part there were a few branch channels. The irrigated area round Bazar 8 extends to 200 hectares, which is two hundred times more than the Bazar 3 irrigation network.

Still more developed irrigation is characteristic of the late Amirabad culture (late 8th to early 7th century B.C.). An example of this may be seen at Bazar 10 and 11 where from a big lateral bed of the Akcha Darya a canal, 10 to 13 metres in width, was dug for a distance of several kilometres.

Thus the monuments of irrigation cultivation in Chorasmia during the Bronze and Early Iron Ages help us to trace all the stages in the development of irrigation from a primitive reservoir system which is a miniature reproduction of the reservoir irrigation system of archaic Egypt to forms of irrigation works that approximate to similar structures of the Greco-Roman period (Figs. 7 and 8).

Now we shall leave the monuments of the southern delta of the Akcha Darya to survey the monuments of its northern delta which have a history of their own.

The Neolithic and Bronze Age antiquities of the northern delta differ little from those of the southern delta, and Neolithic finds in particular preserve a distinctly Kelteminar character; but the monuments of the Bronze Age of the northern delta exhibit substantial peculiarities of their own.

In 1954, in the Kamyshly district, by the very apex of the northern delta we discovered two sites—Kamyshly 1 and Kamyshly 2, the culture of which

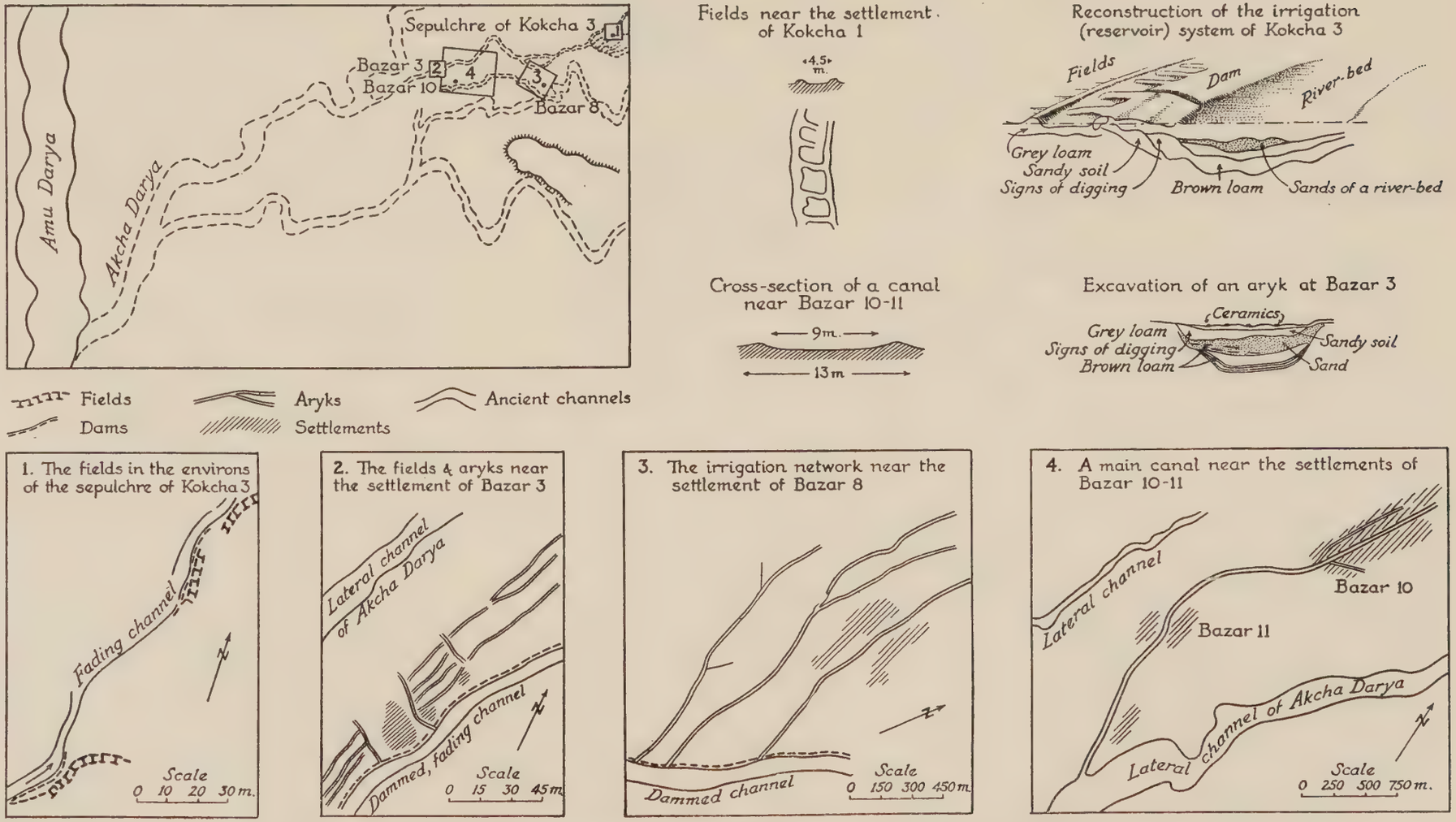
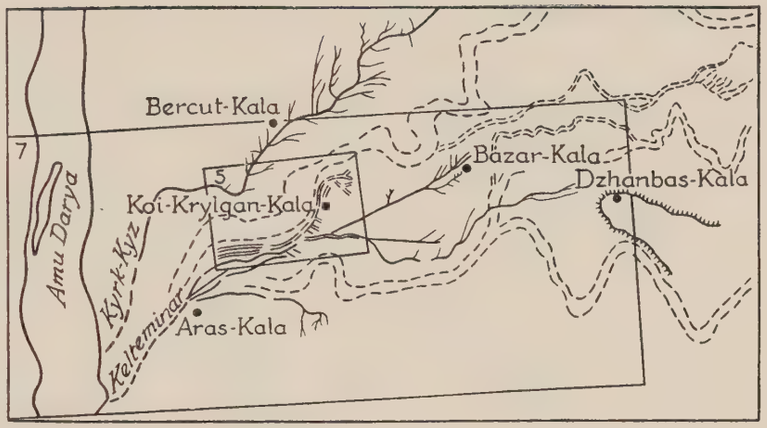
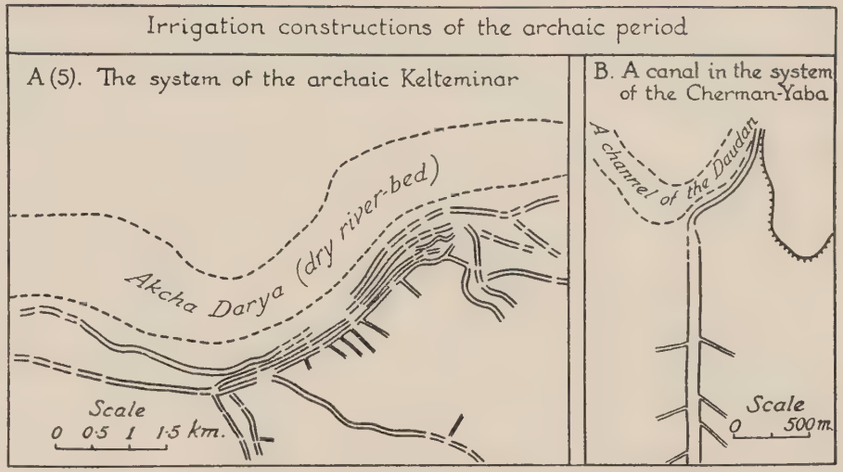
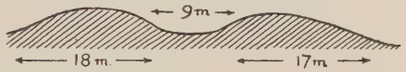


Fig. 7. Historic development of the irrigation systems: Primeval Period

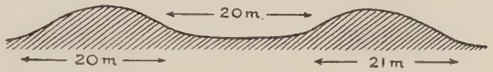



Irrigation constructions of the archaic period
A (5). The system of the archaic Kelteminar
Akcha Darya (dry river-bed)
Scale
0 0·5 1 1·5 km.
B. A canal in the system of the Cherman-Yaba
A channel of the Daudan
Scale
0 500m.

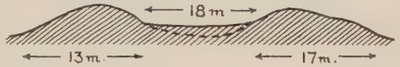
Cross-section of the Kangyui canal in the environs of Koi-Krylgan-Kala

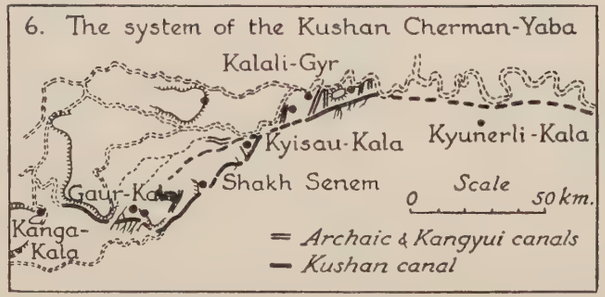


Cross-section of the Kangyui bed of the Kyrk-Kyz



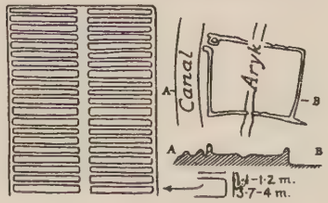
Cross-section of the Kushan bed of the Cherman-Yaba



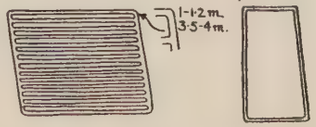


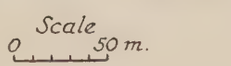
Fields of the archaic period

Fields of the Kangyui period

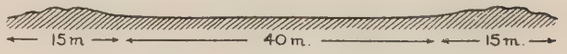


Fields of the Kushan period

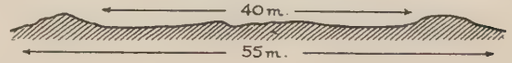




Cross-section of the canal within the system of the Cherman-Yaba



Cross-section of the archaic canal in the environs of Bazar-Kala



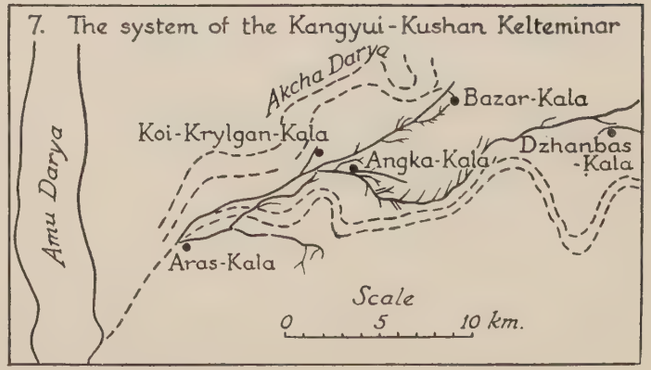


Fig. 8. Historic development of the irrigation systems: Antique Period

turned out to be substantially different from the culture of the south Akcha Darya delta. At these sites, and particularly at Kamyshly 1 we found a peculiar assemblage of sherds and flint and quartzite artifacts. The pottery, burnished and ornamented in red and black, partly recalls Anau forms and partly finds distant analogies in the pottery of Transcaucasia at the middle of the second millennium B.C. The flint and quartzite industries were represented by numerous knife-like blades. The condition of the deposits, which had been badly disturbed, does not allow us to assert positively that the pottery and the stone industry were contemporary, though I regard this as quite possible.

In 1955 we discovered scores of sites of this new culture, named by us "Kamyshlynski," scattered along different channels of the northern delta. The material from these sites revealed the same combination of the painted pottery, quite frequently bearing also stamped ornament, mostly of herring-bone type encircling the neck of the vessels, and of stone (mainly quartzite) artifacts represented by knife-shaped blades, small blades, scrapers, and borers. We found particularly rich material at Uch-Tagan 2, close to the northern tip of the Uch-Tagan hills in the western part of the Akcha Darya delta. Here, together with the Kamyshlynski pottery, we found in one place ten arrow-heads worked by fine pressure flaking, a big curved knife and a fragment of a big spear made of the same material and in the same technique.

The types of the Kamyshlynski culture are no doubt related to those of the early Suyargan culture. While, however, the latter existed for only a brief period and soon began to mix with the Tazabagjab culture and later was subject to the influence of the Karasuk elements (thus giving rise to the late Suyargan culture) the Kamyshlynski culture retained the ancient Suyargan traditions for many centuries.

Kamyshlynski sites date from the middle of the second millennium B.C. to its end.

It is noticeable that in the more northerly parts of the lower Akcha Darya delta, adjacent to the Bel-Tau heights and the Aral Sea, remains of the Kamyshlynski culture disappear. Their place is here again taken by remains of the Tazabagjab culture, many of which exhibit traces of eastern influences expressed in ornament reminiscent of certain Ferghana forms. I am inclined to believe that the spread in this coastal area of Suyargan influence, like the penetration into it of eastern elements from the upper Syr Darya, is due to the fact that here the Akcha Darya River begins to branch. The several channels of the Akcha Darya, as we have already pointed out, originally carried their waters westward, discharging into the northern part of the ancient Chorasmian Lake. At the same time from the east this area is approached by channels of the delta of one of the most ancient beds of the Syr Darya, now known as the Zhany Darya. Thus we can suggest that the area of the

Tazabagjab culture enclosed the area of the Kamyshlynski culture on the north, west and south. At the same time in the north-east the Tazabagjab culture came into contact with the area of ancient Cis-Jaxartes Bronze Age cultures, so far virtually unknown.

The distribution of Bronze Age remains in the northern delta is completely different from that in the southern delta. While the latter, as stated, are located on the *taqyr* immediately on the banks of the delta's lateral channels, the location of the contemporary remains in the northern delta conforms to Neolithic traditions. Like the Neolithic sites, they are located along the border of the delta region and on the original sandy heights adjacent to the delta, and also on the original sand ridges within the delta. Most sites are located in the hollows between those ridges that are nearest to the dunes' edges; they do not spread far into the dunes, and most of them are located near the northern tips of the ridges. As a rule the sites are concentrated on the north-eastern slopes of the depressions between ridges, presumably owing to a tendency to seek some protection from the predominating north-east winds. The distribution of the Bronze Age sites differs from that of the Neolithic sites in that the latter are scattered more peripherally round the dunes, often confined mainly to the first depression within the edge of the dune.

The foregoing facts justify the belief that both the life of the Bronze Age population of the northern Akcha Darya delta and the geographical conditions of that delta differed substantially from those of the southern delta. While in the southern delta the water supply in the Bronze Age was apparently much less than in the Neolithic period, and the population, as we have seen, took to irrigation cultivation, the northern delta during this time had apparently enjoyed a more generous supply of water and its population preserved the traditions of the Neolithic life to a greater extent. So far we cannot assert that the inhabitants of the northern delta practised no agriculture: it is possible, even quite probable, that primitive cultivation was conducted there, but of course hunting, fishing and stock-breeding played a greater role.

At first sight the thesis that the water supply of the lower delta of the Akcha Darya was greater may seem strange. But here we have to take into consideration the fact that substantial changes could have taken place in the hydrographic regime of that area. Apparently the ancient subsidiary river-beds of the Akcha Darya at that time got their waters from the Chorasmian Lake in which the water level rose substantially. On the other hand, the lower delta received additional water from the eastern channels. This was made possible by the exceedingly gentle inclination of the river beds in the delta. All this led to the formation in the area of the Dzhetim-Sengir *taqyrs* which stretched laterally southward from the modern cultivated tract to the lower reaches of Zhany Darya, of a vast shallow lake the waters of which supplemented the channels

of the Akcha Darya northern delta. This is substantiated by sediments containing fresh water fauna observed on the banks of some of these channels.

In the Bronze Age the water supply of the Uzboy was much less than in Neolithic times. All this stands in contrast to conditions in both the northern and the southern Akcha Darya deltas, the Bronze Age population of which greatly exceeded the Neolithic. This allows us to suppose that towards the close of the second millennium B.C. there were already indications of the incipient diversion of the predominant direction of Amu Darya northwards to the Aral Sea, close to the modern route. This might have determined the foregoing changes.

The Irrigation System of the Iron Age

Traces of the Early Iron Age are very meagre along the Uzboy, and amount to no more than isolated finds of Scythian arrow-heads and fragments of the so-called "barbaric" pottery. No accumulation of material of that period which could be termed "sites," to say nothing of traces of permanent habitations, were found here. Finds of ancient wheel-made pottery are limited to a few fragments which clearly show that during the period there were no permanent settlements along the Uzboy and not even a caravan trail. All this means that by the beginning of the Hellenistic period the Uzboy River had completely dried up.

In the area of the lowest reaches of the Akcha Darya delta, close to the Aral Sea, on the contrary, sites of the early Iron Age are very numerous. This culture, provisionally dated to the second quarter and the middle of the first millenium B.C., and designated Barakhtam, is very interesting. It was first discovered by us during our investigations in 1955 north of the Dzhetim-Sengir *taqyr* and east of the Bel-Tau heights in the immediate vicinity of the Aral Sea. Remains of the same culture are also found in the channels of the Zhany Darya delta, along the river bed of the Zhany Darya and the ancient lakes that derived their water from this branch. The Barakhtam remains are quite distinctive. They are found in an environment similar to that of the monuments of the Bronze Age in the marginal depressions between ridges within the original sands of the delta. Very characteristic of sites of this culture is a combination of elements belonging to different periods. The bulk of the implements consists of coarse stone flakes and fragments of axes made from black sandstone. The pottery exhibits traces of Bronze Age traditions; despite a greater coarseness, the vessels often preserve a poor stamped and incised decoration resembling the ornamentation of Kamyshlynski pottery. Besides this material we find at these sites also bronze implements, such as arrow-heads of Scythian type, which provide the principal evidence for date here; we find, too, big bronze fish-hooks and, what is most peculiar, many traces of a

metallurgical industry: ingots and slag. Most likely we are here confronted with a culture of coastal Scythian tribes which were apparently incorporated in a big tribal alliance of the Apasiaks, "Water" or "River Saki" of which we read in later classical sources.

The remains of the Bronze and Early Iron Age discovered in 1955 in the northern Akcha Darya delta and the lower reaches of Zhany Darya show that, beginning with the Bronze Age in the northern area of Chorasmia near the Aral Sea and in the adjacent Syr Darya areas a characteristic economic system begins to take shape, distinct from the economic system characteristic of the population of the apices of deltas of the Amu Darya. While in the latter primitive irrigation agriculture was beginning, in the peripheral part of the ancient deltas survived the traditions of the Neolithic hunting-fishing economy, probably combined with cattle-breeding and the rudiments of primitive agriculture.

This difference is expressed still more vividly in the early Iron Age at the beginning of classical times.

In the southern Akcha Darya delta during the formation of the so-called Amirabad culture, which replaced the Bronze Age cultures of this area, a transition took place from the primitive forms of irrigation (which involved merely the damming of shallow channels of the delta and the artificial flooding of the adjacent fields, or the conservation of a small irrigation network branching immediately from the dammed channels) to making big trunk canals from the largest branches of the Akcha Darya. These canals stretch for several kilometres, and in size approximate to the canals of classical antiquity, reaching more than 10 metres in width. At the same time in the lower peripheral part of the Akcha Darya delta, close to the Aral Sea, tribes with traditions of the Kamyshlynski culture of the Bronze Age with its primitive mixed economy continued to live. The greatest changes in the economic and social system took place in the south about the 7th and 6th centuries. The swift development of irrigation agriculture created the prerequisites for the transition to the ancient slave-social system, a transition which was particularly necessary since further development of agriculture proved to be impossible under primitive communal social relations. Such unreliable sources of irrigation as the delta channels, drying up and continually changing their direction, proved to be insufficient. Huge trunk canals branching immediately from the Amu Darya and thus providing a stable source for irrigation were being constructed. An analysis of the topography of the ancient irrigation system convincingly shows that it is nothing but an artificial reproduction of the ancient Amu Darya delta. The isolated primitive communities could not cope with the construction of such a mammoth system. This task required State centralisation on a big scale and a large labour force not employed in other forms of agriculture. Such

a force under the conditions then prevailing could be provided only by slaves, supplies of whom were constantly recruited through ever-growing tribal, and later inter-state, wars.

A peculiar economy of "semi-nomad cultivators," to some extent continuing the traditions of the Bronze and Early Iron Ages of the same zone, began to develop in that period in the peripheral part of the new delta, based on the still existing channels of the Prisarikamishskoi and on the southern channels of the Syr Darya (Kuvan Darya and Zhany Darya), and also on the waters of a vast artificial "delta." These "barbaric" patriarchal tribes, comprising the peripheral part of the slave society, developed in close economic, political and cultural relations with the foremost centres of the ancient Chorasmian culture, and in a certain part of the upper and middle Syr Darya. The culture of these tribes is well represented by such remains as those of Dzheti-Asar, Chirik-Rabat, Babish-Mulla and Barakhtam.

The history of the ancient irrigation network of Chorasmia, built by huge masses of war-captives, can be traced in detail by investigation of its well-preserved monuments of ancient irrigation. Capacious canals that stretch for several kilometres, with a width of some 20 to 40 metres, irrigated huge tracts of well-preserved fields next to which we find magnificent ruins of ancient cities; fortified and open settlements constitute a magnificent monument to the colossal labour of many thousands of nameless creators of the rich ancient Chorasmian civilisation. This is a counterpart of the labour of innumerable masses of nameless slaves who created the splendid civilisations of the ancient Mediterranean and classic Orient. Thus the grandiose system of Chorasmian irrigation was created in the same way as the irrigation systems of Central Asia and of other countries practising irrigation farming.

The irrigation system of the classical period embraces the entire territory of the Prisarikamishinsky and the southern Akcha Darya delta of the Amu Darya. The huge fortresses of Kzyl-Kala, Toprak-Kala, Ayaz-Kala, Kirk-Kys-Kala, Kurgashinkala, Bazar-Kala, Dzhanbas-Kala, on the right bank; Gaur-Kala, Kanga-Kala, Mangyr-Kala, a nameless settlement in the lower reaches of the Middle Daudan, two ancient fortresses on the Buten-tau heights on the left bank of the Amu Darya and located in the lower reaches of big canals or (on the left bank) of the existing channels of the Amu Darya delta, show the degree of development of the territory of the old deltas in antiquity. Such a distribution of ancient monuments shows that from the middle of the first millennium B.C. on the southern Akcha Darya delta the irrigation of fields was provided for by a vast artificial network. Not one of the channels of the southern Akcha Darya delta at that time existed. We see that the ancient irrigation system of the right bank in a way repeats the ancient southern Akcha Darya delta.

The three basic, most powerful ancient irrigation trunk lines, continuing the direction of recent main canals, Kelteminar, Tazabagjab and Amirabad, run parallel to the three largest branches of the south Akcha Darya.

We have made a most detailed study of the eastern zone of these canals—the ancient Kelteminar.

The oldest antiquities of the Kelteminar are dated back to the archaic period of ancient Chorasmia in the 6th to 5th century B.C. The monuments of this period are poorly preserved here owing to intensive utilisation of the irrigated lands of the lower Kelteminar in later periods. There are, however, plenty of traces of sites dating to this period and they make it possible to date contemporary irrigation works. The canals of the archaic and the Kang-Ku period are characterised by their large size, and vary from 30 to 40 metres in width between the banks. They extend along the border of loams in the immediate neighbourhood of, and parallel to, the old river bed of one of the main channels of the Akcha Darya delta. The trunk line irrigation ditch, apparently, then took off immediately from the Amu Darya. Its branches, the distributive and irrigation canals, extend from the trunk line eastwards, for the old river-bed lay to the west. The trunk canal runs from the river for many kilometres, and its banks were densely populated. This is shown by the well-preserved plans of the ancient fields and by numerous, though poorly preserved, traces of settlements.

Apparently the same type of irrigation persisted in the subsequent Kang-Ku period (4th century B.C. to 1st A.D.), transition to a more modern and economical system of irrigation which to some extent approaches the later medieval systems. The trunk canal of Kushan times which was a continuation of the ancient Kelteminar, traverses the middle of a huge tract of loams with branches at right angles to right and left. The old river beds along which had been constructed the archaic canals serve here as flood-water canals for the Kushan irrigation system. This new and more modern type of irrigation is characterised also at the same time by narrower canals (not more than 10 to 15 metres between banks), but these canals are deeper and their banks are higher.

A somewhat different situation prevailed in the recent Cis-Sarykamyshinski delta where the principal channels were apparently still functioning. Thus the waters ran, though in small quantity, along the southern Daudan, which flowed east of the Kanga-Gyr, close to the Kanga-Kala fortress and which supplied water to the irrigation system located in part of its delta north-east of the Kanga-Gyr. This canal did not reach Sarykamish. The flow in one of the channels of the mid-Daudan was greater, and here the waters reached the Tyunyuklu basin, filled it and flowed out along the Daudan Canyon into the Sarykamish.

The extensive Daryalyk irrigation network which dates to the later medieval period has practically erased the traces of the ancient irrigation. However, the displacement of the ancient fortresses of the antique period on the Buten-Tau height show that the Daryalyk river bed apparently carried water in classical times. We have made a detailed study of the ancient irrigation system of this period of the old Cherman-Yaba canal constructed along the course of the southern channel of the Daudan, the upper part of which is usually called the Tuni Darya, while its lower course close to Sarykamish was known as Kanga Darya. The oldest canals which date to the archaic period and which irrigated the area of the earliest known ancient fortresses in Chorasmia such as the Kuzeli-Gyr and Kalali-Gyr, start from the upper part of the southern Daudan. The canal branches from the river channel at right angles and runs due southward, ending after some 6 to 8 kilometres in the area of a small branch of the same channel which flowed from the south round a group of narrow islands in the delta surmounted by the ruins of fortresses between the channels.

Most impressive of the archaic canals is one occupying the central position approximately between the fortresses of Kalali-Gyr 1 and Kuzeli-Gyr with its head works between two nameless heights. The total width of the construction reaches 70 metres with 40 metres between the banks. The numerous heads of the broad and short canals of the archaic period are also reproduced in similar constructions of the Kang-Ku time. In the same way some of the Kang-Ku systems branch from the channels of the southern Daudan and irrigate small plots of land: such is the canal which irrigated the vicinity of the Kalali-Gyr 2. Most likely the northern Daudan operated in the early classical period, in its greater part irrigating the lands around the ancient town of Mangyr-Kala.

Of great interest is the irrigation system which dates also to early ancient times giving water to the Kanga-Kala fortress lands. Here the vanishing channels of the Kanga Darya delta near Sarykamish were used as sources of irrigation. Small distributive canals and still smaller irrigation networks branch from them at right angles.

The study of the Kanga Darya irrigation system reveals that the Kanga Darya delta had changed its position many times during the classical period, moving either closer to Sarykamish Lake or farther from it. The irrigation system which was based upon this delta shifted its position accordingly.

Thus we see that during the early classical period the left bank irrigation was to some extent based upon the vanishing channels of the delta and in this respect differed from the right bank irrigation system. However, already during the Kang-Ku and Kushan periods, and particularly in the latter, we see a clear tendency to join the canals into a large unified system which is traceable already in the area of the Kalali-Gyr fortress and may be particularly well seen farther

south along the line of Kyisau-Kala–Shakh-Senem–Gaur-Kala, south-west Cape of Tarim-Kai.

Thus in the Kushan period all individual irrigation systems of the southern Daudan, which were based upon its vanishing channels, were united in a single system which is traceable up to the point where the southern Daudan branches off. Here the Kushan canal cuts at right angles across the earlier canals, running almost parallel with the medieval Cherman-Yaba, which may be traced up to the recently cultivated tract north of the Zmykhshir town (the medieval town of Zamakhshar). Here, the territory is covered by a dense network of medieval and later irrigation channels which flowed into the dry river bed of the Daudan. It is difficult, therefore, to determine the starting point of the Kushan Cherman-Yaba. It is, however, quite probable that it began in the Amu Darya as did the right bank canals at this time and even earlier.

Thus we see that towards the close of the classical period, and particularly so when Chorasmia was incorporated into the vast Central Asian-Indian Empire of Kushans, one of the four great empires of the ancient times, the irrigation system of both the left and the right bank of Chorasmia underwent a radical reconstruction. The archaic and the classical Kang-Ku irrigation systems are substituted for more progressive and economical forms of the Kushan area irrigation which in many respects are the prototypes of the irrigation system only fully developed in medieval times. The material provided by the history of irrigation shows us that in the Kushan period in Chorasmia, as in the Mediterranean area during the Roman period, material pre-requisites were being created for a transition to a more progressive medieval-feudal system. However, as we shall see later, this transition both in the West and in Central Asia, was long and difficult and was accompanied by a severe social-political crisis, barbarian invasions, economic and cultural decay.

Within the time available I cannot describe in any detail the results of our excavations of the Chorasmian monuments of classical date which were begun as far back as in 1939; but I shall say a few words about the discoveries made during the recent excavations which are thus far not widely known.

In 1953 we resumed excavation of the most ancient of all known monuments of the classical culture of Chorasmia—the Kuzeli-Gyr town, of which an earlier description based primarily upon the survey work, has been given in *Ancient Khwarizm*. We may recall that this fortress was located close to one of the biggest canals of the archaic period, and stood on the summit of one of the heights of the same name already mentioned. The fortress was of almost triangular form, with a total length from north to south of one kilometre. Discoveries during the excavations have fully confirmed the earlier dating of this monument. The basic dating materials here were the numerous Scythian

arrow-heads which must be attributed to the 6th to 5th, or perhaps 7th to 6th, centuries B.C.

At the same time the excavations of 1953–54 not only enriched our understanding of the life of the archaic people of Chorasmia, but help to supplement the account of Kuzeli-Gyr given in *Ancient Khwarizm.*

The excavations showed that the "residential walls" of the settlement serve primarily for a single structure in the form of a corridor enclosing the entire settlement. The width of the corridor varies in different parts of the monument: on the south-east it is 2·5 metres, and on the north 4 metres wide. The preserved walls of the corridor were made from *pakhsa* (a clay wall), though, judging by the fallen super-structure, the higher parts of the walls were made of crude brick. Within the corridor, particularly in the southern part of the settlement, an occupation layer was found everywhere showing that it was used as a dwelling. To the inner side of the corridor are annexed a number of buildings of different shapes and sizes. Some of them have brick walls, others are walled with wattle and daub. It was in these buildings and in the corridor that we made the best of our archaeological finds—numerous fragments of vessels, animal bones and Scythian arrow-heads.

Excavation showed that the fortress underwent two periods of construction, and the technique of the earlier buildings, dated to the 6th and the beginning of the 5th century B.C., differs greatly from the building technique of the classical Chorasmian. Thus the standard brick dimensions are quite different. The predominant size is not of the square form (40 × 40 × 10 cm.) typical of the classical Chorasmian, but rectangular (52 × 26 × 10 cm.). In place of the open hearth, characteristic of the classical period, we find here a stove with two compartments. Flat ceilings predominate. No arches have been noted. If we add to all this the archaic nature of the pottery and an exceptional abundance of bronze Scythian arrow-heads with a complete absence of sling-stones (which had begun to play a prominent role from the 5th to 4th century B.C.) archaic Chorasmia displays a number of specific features.

Judging by the upper building layer of Kuzeli-Gyr, which is also dated to the 5th century B.C., but to its latter part, the transition to the square brick was already taking place during that century. The pottery of the lower layer hardly differs from that of the upper, although in the latter we find many forms which are fully developed in the classical Kang-Ku period later on.

During the excavations in the central part of the town the remains of a very large building were found. The occupation layer in this building was preserved only to a depth of 50 centimetres. While the finds made in this building, which had existed during both structural periods, do not differ from those in the corridor, the plan and the size of the central complex proved to be completely different. The big hall of the central building of the Kuzeli-Gyr covers

285 square metres, and has numerous hearths related to both layers. Of similar size and proportions are the dwellings adjacent to this hall, so far only partially excavated. The regular planning and the great size of the complex give the entire structure an impressive ceremonial character. Now if we recall that the residential corridor of the fortress wall and the buildings adjacent to it are but narrow buildings like cells, we must admit that we are dealing with the houses of different social groups of the Kuzeli-Gyr population.

Of special interest are the foundations of three towers excavated in 1952 north of the central building. At present it is impossible to determine their function, but they are undoubtedly associated with the central building and will probably prove to be ritual structures of some kind—perhaps *atesh-Gakhi*, "the place of fire," which is known to have occupied a prominent place in ancient Zoroastrian architecture. In this connection I should point out that the planning of Kuzeli-Gyr resembles the planning of a magnificent oval fortification, Chirik-rabat which we discovered in 1946 and described in *Ancient Khwarizm Civilisation*. This fortification was located in the centre of an area populated by the tribal union of Opasyak. The lower strata at Chirik-rabat date to the same period as Kuzeli-Gyr, but it continued in occupation much longer. Here in the centre of the town stands a large building, a sort of acropolis, north of which are three sand hills surrounded by ruins of towers. The main population of Chirik-rabat as well as of Kuzeli-Gyr was concentrated in the southern part; the northern part, located in both cases on lower ground, has yielded fewer traces of occupation.

Of great interest are the excavations of the northern wall of the Kuzeli-Gyr, where the defensive structures are much better preserved than in the southern part. Here walls still rise to a height of 3–5 metres. This good preservation is due to the fact that after being built the wall was scarcely used. The intramural corridor was artificially filled with river slime probably collected during the cleansing of the canals. The same material was also used to strengthen the wall on the outside. The residential corridor was built on this ancient wall which was thus converted into a massive base for the town wall. The ancient wall, which was thus well preserved, differs substantially from numerous structures of the Kang-Ku era. Its loop-holes are not arrow-shaped but of a rectangular form. They are made not in raw brick, but in *pakhsa*, and are arranged in two tiers and staggered in chequer-board pattern. The archer's gallery, however, had only one floor from which the same bowmen could use the slits of both tiers.

Not only the architecture but their pottery and weapons shows big differences between the archaic and the classical periods of ancient Chorasmia. These differences are clearly illustrated by an analysis of the stock kept by the Kuzeli-Gyr population. While small-horned cattle, sheep and goats, pre-

dominated in the herds of the classical period, the archaic period is characterised by a great predominance of big-horned cattle, horses and camels.

A similar composition of the cattle herds has been noted in an analysis of the later Tokharian remains of the Dzheti-Asar complex, on the Kuvan Darya—one of the western channels of the old Syr Darya. The Avesta manuscripts point to the same composition of the herds. Here we see an ancient type of stock-breeding going back to the Bronze Age.

We must point out that the characteristics of Kuzeli-Gyr pottery show that it was very close to the pottery of the contemporary sites in Baktria (lower strata of Kabadiana, excavated by M. M. Dyakonov) and southern Turkmenia. At the same time we must endorse the conclusions of R. Ghirshman, as to its remote but nevertheless undeniable similarities with the pottery of the Achaemenid strata at Susa.

The last classical period of ancient Chorasmia reveals more peculiarities in pottery as compared with the other areas occupied by Iranian-speaking tribes in Central Asia, Afghanistan and Iran.

A big fortress of almost rectangular form, Kalali-Gyr, dates to a later period and is located east of Kuzeli-Gyr. A description of Kalali-Gyr has been given in *Ancient Khwarizm*. The excavation of this fortress was conducted in 1953 by one of the parties of our expedition led by Y. A. Rapopat. Here we found building methods which are much closer to the classical period. In particular we noted the absolute predominance of square crude bricks. However, a number of features allows us to regard this structure as separated from Kuzeli-Gyr by a comparatively brief interval. The walls of this fortress and in particular the magnificent palace located close to its western wall differ in many features from the structures of the Kang-Ku period. The construction of the walls of the palace was never completed. The fortress was abandoned during its construction, and later on in the Kang-Ku and the Kushan periods only the palace building and some corners of the town wall were partially used.

The palace building is remarkable for the exceptional regularity of its planning, for the employment of thin alabaster bricks for the flat roof and for the rich wall decorations of the same material. The latter are attested by a mould for casting a relief—the head of a fantastic animal of griffon type.

We have every reason to suppose that this fortress, built, according to the data available, by the end of the 5th or in the very beginning of the 4th century B.C., was a large defensive structure dominating the Cherman-Yaba irrigation system and was most likely built during the period of Achaemenid rule of Chorasmia. Most probably the discontinuation of its construction is connected with the liberation of Chorasmia from Achaemenid dependency. This is proved by a sterile layer between the deposits of this period and those belonging to the period of subsequent use. During the early Kang-Ku period

(late 4th–early 3rd century B.C.) the palace building was used as a barracks for the Chorasmian border garrison. However, it was soon abandoned again and served in the late Kang-Ku and Kushan periods only as a magnificent Zoroastrian cemetery, the excavation of which yielded rich and interesting finds.

A great number of ossuaries, mainly in the niches cut in the walls, were found in the palace building and in the western and northern walls. More than forty ossuaries, containing over one hundred burials, were found during the excavation, and provided abundant craniological material. The ossuaries were made of stone, or crude fired brick and were of diverse forms. They included sandstone ossuaries of rectangular form with or without legs; pottery ossuaries in the form of sarcophagi on legs with a small aperture in the top closed with a lid; ossuaries in the form of horizontal barrels on legs with an opening in the top; rectangular ossuaries without legs and with a lid; ossuaries of almost square form without legs and with an opening in the upper part closed by a round or oval lid decorated with a figure of a bird. The latter form is much closer to the late ossuaries of Semirechiya.

Particularly noteworthy were two big structures located on the northern walls and resembling potters' kilns, the upper chambers of which were used as "towers of silence" (*Dakhma*)—the place where the corpses were prepared for secondary burial in the ossuaries; but it is hard to say whether this was their original function or whether they were first used for another purpose.

Archaeology and the University*

By W. F. Grimes

In pondering my choice of subject for this lecture it seemed that it might be appropriate to attempt some examination of the position of archaeology in the University to-day. The Institute of Archaeology now has behind it a respectable past: its impending transfer to a new building in the University centre very much enhances its possibilities for usefulness in the future. But I confess that any rashness of prophecy in this direction on my part is likely to be tempered by the knowledge that I may myself be closely involved.

Tradition and inclination both demand, however, that in the first place I should make pious acknowledgment of the achievement of my predecessors —and I use the plural advisedly. For it seems to me that Sir Mortimer Wheeler, the founder and first Director (and incidentally my first teacher in another place), and Professor Gordon Childe embody the two archaeological traditions which it must ever be the aim of the Institute to foster and develop. I hasten to add that I am not here to be taken to mean that either of these outstanding scholars is limited in his approach to his subject, or unaware of its many-sidedness: this would be palpably untrue. To Wheeler the great excavator, however, the Institute owes its achievement in the field of practical archaeology with its devotion to the all-important techniques that have to do with archaeological evidence. Childe's writings have a world-wide distribution which has ignored curtains of all kinds: as synthesist and philosopher he has imbued us all with an awareness of the function of archaeology as one of the chief means of elucidating the development and spread of civilisation. As the inheritor of this joint tradition I can only hope in all humility to try to maintain it with due balance.

With due balance. This is the point at which to consider what kind of archaeologists we are seeking to produce—though I must add in passing that in this as in all else I am voicing purely personal opinions, and in so doing blandly ignoring (without being entirely unaware of) the administrative or other difficulties that they may raise.

In those expansive years at the end of the war archaeologists in general were fired by an optimistic spirit which inspired them to visualise a world really fit for archaeologists to live in, with a multiplication of University posts,

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a considerable extension of State archaeological services at home and abroad, and a large-scale development of museums from which both the humanities and the natural sciences would benefit. It goes without saying that all this came to pass only in part, though growth there certainly has been, some of it considerable, and in all three fields.

But with growth other problems have come; and with them a clarification of the pattern of demand, which seems likely to be fixed for some time. There have been increases in the number of teaching and research posts in the Universities and national museums which many people would still consider to be inadequate; and there has been improvement in the smaller museums which has sometimes resulted in the appointment of trained archaeologists to key positions. But the greatest development has been in "official" archaeology, and in particular in the recording and preserving organisations, the Royal Commissions on Historical Monuments and the Ancient Monuments Inspectorate of the Ministry of Works. This development springs partly from the need to overtake the lost time of the war years, but above all from destructive threats to antiquities arising from various kinds of post-war development projects—the ploughing of marginal land, housing-estates, gravel-digging, and the like. The situation from this point of view is indeed a very serious one—how serious nobody can quite know. The one certain thing is that all over the country the antiquities which are the chief clues to many centuries of our past history are being destroyed—and destroyed without record.

This sequence of events would seem to indicate that while we should press for more archaeological activity in *all* fields, it is our urgent duty today to see that we maintain a steady flow of people equipped, whether as professional archaeologists or as amateurs with a sound training in archaeological method, to meet the demands made on us by these destructive threats to our inheritance from the past. I am not sure that the Universities have succeeded in this so far, and I wonder how our successors will view our efforts.

Beyond our shores, in the Commonwealth and elsewhere, a growing appreciation of the importance of archaeology has also created a demand which must be met. Though the conditions vary widely, the basic requirements are not so very different and call for the same kind of treatment.

But this need to deal with a contemporary situation is only one justification for "due balance." The expression has a significance here which is not unrelated to the somewhat uncomfortable position which archaeology occupies in a sort of no-man's-land between the sciences and the arts. I shall have cause to say something more later of the relationship of archaeology and history; for the moment the point that I want to emphasise is that archaeology's essentially humanist aim must not be allowed to blind us to the scientific nature of many of the processes which archaeologists employ in pursuing it.

Here, of course, I do not mean the aids which the natural and physical sciences lend in problems of environment, dating, and the like: I am concerned with what I may call the purely archaeological processes, those which are involved in the collection or handling of archaeological evidence and which may demand at times a special adaptation of scientific or technical practice to meet an archaeological need. The fact has to be faced that this humanity has requirements in its basic teaching which can only be met by methods which are not appropriate to an arts subject in the ordinary sense, some of which indeed are not exactly paralleled either amongst the sciences, if only because of the problems of organisation that are involved. The question of special provision for them, therefore, is one to which the usual arguments may not apply.

In the interests of the balance to which I have referred, training in field-techniques is as essential to the archaeologist as to the natural scientist. He may himself prefer to pursue his academic objectives in the centrally-heated comfort of library, laboratory, or museum; but over a considerable area of archaeological endeavour his work will lack reality if he loses sight of its crudely physical background. Man-made bumps and dents in the ground must be for him what rock-exposures and land forms are to the geologist: the excavation of such bumps and dents is his one supreme way of amassing his primary evidence under properly controlled and fully observed conditions. All of which no doubt is sufficiently obvious. I labour it so devotedly in order to emphasise our responsibility for providing teaching and experience in this branch of the subject, as one which has not received as much attention as perhaps it should have had, and one which has a particular bearing on the general archaeological situation which I have already very briefly outlined.

I have not the slightest doubt that in those fields where I am qualified to judge, we must somehow allocate more time specifically to training in archaeological techniques if our archaeologists are to make their fullest contribution to the subject, not only in Britain but elsewhere. Though here I am not thinking of field techniques only, I realise that I am exposing myself to a possible charge of seeking to produce archaeologists with a bias towards "field-work." But at the risk of being wearisome I must emphasise again that the aim is summed up in the expression "due balance"; and that, quite apart from the inherent requirements of the subject itself, unless our students are given an ordered introduction to its full range they are not properly equipped to select an area for their own specialisation within it. I am giving away no secrets when I say that it is this kind of deficiency that provokes most outside comment at the present time, and I believe that it is in essence the outcome of conditions under which we work.

It is not part of my present purpose to discuss the internal arrangements of the Institute. This subject must, however, be mentioned to the extent that

it bears upon the problem which is implicit in what I have just said—the problem of the time in which to do all that is required of us.

Here, it seems to me, we must sooner or later face squarely the difficulties created by the varying arrangements under which candidates work for the Institute's Post-Graduate Diplomas. We accept students on a full-time or on a part-time basis and it is true that part-time people are expected to take longer over the course than their more fortunately placed fellows. Yet the limitations on their time which spring from the fact that the part-time people can only attend in the evenings have the effect of seriously limiting both the range and the depth of the teaching. Let me say here and now that I would not wish in any way to impair the great tradition of providing for the external and part-time student which is one of the most remarkable achievements of the University of London: I suspect, nevertheless, that we are attempting if not the impossible at least the undesirable in seeking to unite two different sets of requirements as we now do—especially bearing in mind that while most of our candidates are graduates, comparatively few of them come to us with previous formal teaching in archaeology. Sooner rather than later an equitable solution to this problem will have to be found. Not unrelated to it is the vexed question of a first degree.

Here I admit to being something of a waverer. I am by no means the first archaeologist to make the point that archaeology is not so much a "subject" in itself as a method, or an aggregation of methods. It is a method of augmenting history; and its purpose is history.

There are obvious dangers in elevating what is essentially a collection of techniques into a degree-subject; yet a full awareness of the dangers and a carefully devised scheme of study aimed at the provision of the requisite background would probably save us from the threat of yet another race of qualified and uneducated technicians to add to those which are said to exist.

But the statement that archaeology is a method rather than a subject, needs immediate qualification. Archaeology may be claimed to be free-standing in that branch of it which is concerned with pre-literate societies, when we call it Prehistory. Over a period of human existence which is longer by many times than the somewhat fluctuating age of literacy the processes of archaeology are practically the only means of elucidating and understanding the human story, of defining human cultures and their interactions and of seeing them as contributions to the growth of civilisation. A big enough assignment in all conscience; and archaeologists must be aware, above all, of their limitations by recognising that there are many questions of the first importance relating to it that they cannot expect to answer. But there can be no mistake about the soundness of the method, the solidity of the achievement and the promise that both hold for progress in the future.

Yet even in prehistory archaeology cannot be entirely free-standing. On the one hand there are the technological achievements inherent in the development of the useful arts whose understanding calls for a specialised acquaintance with technological subjects in the light of modern knowledge. On the other, there is the natural history of man the human animal, at odds with his environment but increasingly able to control and influence it to a degree far beyond the capacity of any other creature, whose relations with that environment demand again a specialised acquaintance with "environmental" subjects.

But if the prehistoric archaeologist cannot move far without a grasp of technological and natural science suited to his particular requirements, the growing importance of physico-chemical research in such matters as Carbon 14 and Fluorine-dating, not to mention the essentially scientific nature of specifically archaeological methods of investigation, gives his study an overwhelmingly scientific content. There is—and let us face it—on this showing every reason why prehistory should be treated as a science, accepted in the Faculty of Science, and equipped for teaching accordingly.

But I need hardly add that the matter is not as simple as that. For one thing, this scientific activity has a humane objective: the pre-literate history of man. For another the scientific methods of archaeology are carried forward into the literate area in which they must be involved intimately with humane studies, with written history and art-history in particular. In the literate field, therefore, concern with at least the broad outlines of historical knowledge becomes inevitable once the archaeologist looks up from his potsherds or his excavation—for only so can he see his problem in its true context and perspective. The depth of historical knowledge demanded of him may vary from one investigation to the next; the amount of linguistic knowledge also may vary, but it would seem that it *need* not extend normally to the original sources which are the essential province of the historian. In other words, while the training in archaeological principles and techniques is the constant, varying only in detail from one region or from one time to another, the background should range from a specialised *ad hoc* grounding in the natural sciences to a similarly devised training in the appropriate humanities, according as the individual student opts for "prehistoric" or for "historic" archaeology.

I am fully conscious that an arrangement of this sort is exposed to criticism from scientists and humanists alike on the ground that in their disciplines it may seem to deal in superficialities. But I want to urge that with their help it need not necessarily be so; for the prime aim will be to produce not good natural scientists, or historians or classicists as such, but archaeologists equipped to discern the wider implications of their subject, with an awareness both of its limitations and of the possibilities of its contribution to a wider field of knowledge.

We are therefore back in the no-man's-land between arts and science, with the implication that the hypothetical first degree might be taken in either faculty according broadly to the division already outlined between the pre-literate and literate ages, the parallel amongst existing academic subjects being that of geography. All I am really trying to do, however, is to put before you certain considerations which, in my opinion, would have to be borne in mind in any scheme that may be produced to give archaeology the full-scale academic recognition that it at present lacks; and if finally it should be agreed that this end is best achieved by a first degree, to express my conviction that the resulting scheme of study must be provided with a real (if varying) scientific content. How this would be done would obviously have to be the subject of discussion, for the requirement is a specialised one. The aim would not be the impossible one of producing archaeologists who are also self-contained in any branch of natural science, but to inculcate a mental attitude and method of approach which, whatever it failed to do, might in its more negative aspect at least make archaeologists of the future more aware of their limitations than we, their predecessors, have sometimes been.

The requirements outlined are those of the archaeological specialist, though they apply, *mutatis mutandis*, over the whole area of archaeological endeavour. I have already hinted that the basic archaeological training within both the pre-literate and the literate fields is a constant: a constant to be applied, extended or embroidered according to the requirements of any particular region or province. Highly important as the variations may be, the underlying principles and the techniques for their application are the same everywhere. Methods of field-survey and of orderly excavation, the laws of typological succession in the development of human artifacts, the technological processes involved in their elucidation, interpretation and conservation—all these have universal relevance. I take it to be the Institute's duty to provide these skills wherever it is required to do so; for without them there will be no archaeologists. Their application to a particular branch of learning—the production, that is, of the complete scholar—is a matter for the Institute in those fields of post-graduate activity (such as "European Archaeology") that have been entrusted to it; with elsewhere other schools and departments playing their appropriate part.

But our task is not completed with the production of the comparatively limited number of archaeological specialists which the modern community may be prepared to support. The academic ideal of the truly-educated mind, widely ranging and enriched by varied contacts and ideas, is one which is much before us to-day, when the dangers of over-specialisation—and of over-specialisation not merely in the sciences—are being repeatedly brought to our notice. It is my submission that in the efforts that are being made to bring about

the desired interplay between the arts and the sciences, archaeology might well have a valuable catalytic function to perform. But archaeology also has a positive contribution to make to other disciplines in both faculties, a contribution which comes in part from the intermediate position between the humane and the scientific to which I have more than once referred. I propose to say something about each in turn.

In a recent correspondence in *The Times* several writers have stressed the importance of the historical approach to the study of scientific thought and achievement as a humanising and educative influence. Though we may think superficially of science as pre-eminently the phenomenon of our time, never was the *cliché* of greater relevance which holds that the present grows out of the past and is only to be understood in the light that the past provides. If we are really to understand our scientific era we can only do so by seeing it in the perspective of history.

The need for such understanding is not to be restricted to any one section of the community: it applies, for somewhat different reasons, equally to the student of the arts as to the scientist. But I make no claims to any originality of thought in suspecting in this context that some champions of humane studies may be in danger of forgetting that the charge of narrowness of outlook which is often applied to scientists may be a two-edged weapon. The broadening process to which educationists pay lip-service, whatever they may or may not do to foster it, is important to us all. The humanist would benefit from contact with the spirit of inquiry which underlies scientific work; it would be good for him to be made aware of man as an incident in the reality of the external world. The scientist, on the other hand, could be reminded through the historical process of the foundations in human endeavour of scientific concepts and achievements which terrify many of his fellow-men because of their very inhumanity. For, shorn of all philosophical discussion of the nature and meaning of knowledge, of culture and tradition, the first steps towards these achievements were by way of the faltering technological experiments and inventions of our ancestors down the ages. They are the outcome of man's earliest attempts to win a livelihood for himself in hostile and intractable conditions; and it is one of the supreme ironies that these efforts at self-improvement have throughout carried the germ of their own destruction. It can do no harm, it may even do good, to use the past to remind scientists and non-scientists alike that they are concerned in the last analysis neither with atoms nor with gerundives, but with human beings—a humanising process in the fullest sense of the word.

The importance of archaeology in this matter lies, of course, in the fact that the early history of technology and of scientific invention is the very stuff of the subject. The elucidation of useful arts such as metallurgy and ceramics, and of their development into industrial processes calls for the close collaboration

of archaeologist and scientist, history and science informing one another. Professor Toulmin has indeed referred specifically to the Institute of Archaeology as a potential focal point for the study of technological history; and whether there or elsewhere, there can be no doubt that as the importance of the subject comes to be widely realised, the findings of archaeology must be an essential element in it.

The contact of archaeology with the world of nature—the world, that is, of the natural sciences—is widely recognised though, in my opinion, far from fully developed. It is long-established in the early phases of the Quaternary period of the geologists, when the human evidence in the form particularly of flint implements has played some part in the correlation of the complicated deposits and the physiographical changes that accompany them. Here early man can be seen in a natural setting to the understanding of which he has contributed. The results of zoology and botany contribute to an ecological picture which is impressive in its broader harmonies, whatever may be lacking in detail. Both provide evidence of climatic and environmental changes, zoology through its animal-remains, botany by way of the plant-histories which emerge largely from contemporary peat-deposits. I would not wish to over-stress the part of archaeology in this, but the fact remains that scientifically speaking the human dating has been a highly valuable correlative, not merely between sites and deposits, but also between other forms of life.

But while ecologists accept the human element as an essential feature in these earlier phases, I am not sure that they appreciate fully either its significance or its potentialities for later times. It is common ground that man has played a dominant part in the production of our present landscape and I wonder, very hesitantly, whether the evidence from archaeology receives enough attention from investigators into the ecological problems involved.

It may be that I am wrong here in thinking that the historical approach is in any way significant. But if I begin with the basic assumption that historical processes have a place in the understanding of the world of nature it seems difficult to avoid the conclusion that the past activities of man in the countryside which it is archaeology's business to elucidate must have their contribution to make. They may do this in two ways: first by demonstrating by superficial remains such as ancient agricultural enclosures the uses to which a piece of land may have been put; secondly by producing under controlled dated conditions natural science material, plant and animal remains and the like, which may have a direct bearing upon natural science problems. The point that I am trying to make is that when an archaeologist produces evidence for the existence of certain species at given periods—with whatever implications they may carry for climate and other factors—he is not merely building up a *human*

picture: he is also accumulating information which might in some circumstances be valuable in other fields.

To take one example, archaeologists frequently reveal beneath their antiquities soils which have been buried, and therefore largely preserved from change, for periods of up to 4,000 years or more—soils which might at times be useful in a natural science context because they would give a clue to natural conditions at least before human exploitation had progressed beyond the primitive stage. There are many parts of this country where at the cost of comparatively little directed effort such evidence would probably be forthcoming—and, indeed, the Institute's Department of Environmental Archaeology is steadily accumulating this type of material, with primarily the archaeological purpose of seeing man against his contemporary background. I cannot help wondering whether more could not be done for co-operation between archaeologists and natural scientists over investigations which are mutually and not merely archaeologically profitable. Some progress I know has been made. The potentialities are by no means restricted to the earlier phases: in some conditions they may be carried down even into medieval times.

I venture to suggest, then, that there may be benefit in a closer association between archaeology and the natural sciences, both in research (for the kind of reason that I have outlined), and in general teaching, which would bring man more clearly into the scientific picture. So that again I am back on my old hobby-horse, my argument for the interplay of the humane and the scientific, with the implication that while ecological scientists are concerned with the living world, the part played by man in it is one which on social as well as on scientific grounds they cannot afford to ignore.

On the "arts" side archaeology has long had close associations with geography (and anthropology) on the one hand and with classical studies on the other: I need say nothing about either now. It is the relationship of archaeology with history which is the overwhelmingly important question in this part of my subject: here I would certainly like to urge a closer collaboration than (with individual exceptions) has yet been achieved.

It would be useless to deny that historians and archaeologists have been, and in some places still are, at odds about aims and methods, particularly in relation to evidence. In the comparative youth of their subject, it has taken archaeologists some time to develop their techniques and clarify their minds as to their purposes; and it was understandable that historians should think of them as collectors dabbling in unconsidered trifles out of the past. It should no longer be so.

I have already defined the historical aims of my subject and have drawn a distinction between its function in pre-literate ages as practically the only source of history and its function in the ages of written record as a means of

augmenting "historical" knowledge. I cannot here enter into a discussion of the validity of archaeological evidence or of the methods by which it is amassed and interpreted. The results must speak for themselves, and the very coherence of the archaeological pattern must be an unassailable argument for its validity. In pre-literate ages that pattern marches with those of the natural sciences where they impinge on one another; and scientific techniques of dating, still in their early stages of development, have begun to demolish the one really serious weakness—the absence of an absolute time-scale by which to correlate varying rates of material progress in different parts of the world.

In the literate periods the archaeological evidence usually fits the documentary story, where the documentation is objective. Here the function of archaeological method is twofold. In the first place it extends and augments the record of events by revealing facts which have escaped the notice of the scribes—or have been ignored by them.

Two examples, both on the doorstep of the University, will illustrate the point. The discovery of the Roman fort in the Cripplegate area of the City of London was a purely archaeological affair to which the records provided no clue. It changes materially our conception of Roman London while explaining a number of puzzling features in the city's plan and structure. But its significance reaches beyond the Roman city to medieval and modern times, for the fort conditioned the later development and has left its mark even on the street-plan of today: a remarkable example of continuity in a flourishing settlement which has seen many changes in 1900 years. My second example might be thought to be irrelevant, seeing that at present medieval archaeology has no place in our teaching. The documentation of an important London parish church like St. Bride's, Fleet Street, might be expected to leave few gaps of any significance to be filled. Yet an archaeological investigation of the church not merely drastically modified the architectural history of the fabric as suggested by the records, but also produced evidence implying an unbroken continuity extending backwards possibly into Roman times.[1]

These facts and others like them may be curious and interesting in themselves, worthy subjects for an antiquarian's scrapbook. But their true importance is that as records of human activity or as expressions of human ideas they are a part of history; and whether on a local or on a wider basis, they add to our understanding of the past. Such sticks and stones may be mute: they may not be understood because of defects in our own approach to them; but they do not lie as the written word has too often been known to do.

The second function of archaeology in the literate era is to enrich understanding of a period by directing attention to those aspects of its culture which

[1] For summary accounts of both of these investigations see Bruce Mitford (Ed.), *Recent Archaeological Excavations in Britain* (Routledge, 1956), pp. 114, 126 ff.

are expressed, not in the written word, but in material things. Such material things may have a purely economic interest, as when the extent of trade in some distinctive article is worked out by plotting its distribution in dated contexts on known sites. Or in the more advanced communities they may be products of quality with a stylistic content which brings them into the province of the art historian. Reviewing one of my predecessor's books recently an anonymous critic seems to suggest that there may be some clash between the archaeologist and the art-historian in their attitude towards their material. This is a view to which I personally should feel unable to subscribe, for it appears to me that the two methods of approach are complementary. In many regions archaeology in the present state of its development is very much like art-history, concerned primarily with architecture and "monuments"; and where little attention has as yet been given to cultural material a varying element of art-history must be an inevitable part of the subject. In the classical field the place of art-history is self-evident, but the work of scholars like Jacobsthal and Fox serves to remind us that prehistory also has its contributions to make to the history of taste. The graphic arts, needless to say, have in general a content that ranges far beyond the material evidence which is the business of archaeology: the pots and horse-brasses of barbarians then become small beer. Yet the barbarians made their ultimate contributions to the Lindisfarne Gospels; and there have been occasions when lowly archaeological objects have helped towards the dating, and therefore towards the appreciation, of a picture in which they have occurred as incidents. In the opposite direction the elucidation of archaeological phenomena from sculpture and painting has probably been more frequent and more significant. But in any case the point surely is that both disciplines have the understanding of the human spirit as a common objective: neither, therefore, can afford to ignore the other in those fields where they make contact.

But this is in the nature of a digression. The important submission that I wish to make here is that in the use of archaeological results in historical teaching there are two gaps to be filled, relating once again to my old literate and pre-literate divisions. In the case of the one, to ignore the evidence of the material things of archaeology is to ignore much that is of value to an understanding not merely of social and economic life, but also of such subjects as contemporary artistic and religious thought, at all levels in the life of the community, which form the background or the setting in which great events and personalities may be understood. Even in this most humane of subjects there are the same dangers of over-specialisation, of narrowness of outlook, of living literally in the world of books. If the aim of history, simply put, is to understand man, his ideas and his institutions, in terms of their development down the years, Salisbury Cathedral must have a place in teaching beside the Rolls Series.

Yet the pre-literate vacuum is in some ways more serious. As a child I remember that I was taught a kind of history that made an abrupt beginning with the Romans: my recollections otherwise are a tangle of Stonehenge, the Druids, and a blue colouring matter called woad. There was nothing before. Times have changed since then and the indications are that the results of archaeology are now presented in a more complete and more ordered manner. Indeed, the weaknesses that remain (and which give cause for anxiety on non-academic grounds in that amongst other things they lead to such troubles as mis-directed excavation by school-children) are largely due to teaching omissions at the institutions which produce the teachers.

But let me not be thought to be concerned here with a vocational matter. The real point is that the teaching of history is still starting too late. Helped by some of its senior sister-sciences archaeology has created a pre-literate history of man which covers a period longer, as I have already said, by many times than the literate era. More important, that period in all parts of the world was the formative period, setting the scene, outlining the pattern for future human development in ways that are still only dimly seen and far from completely understood. It may be a criticism as much of some archaeologists as of some historians that this relationship has not been more fully developed in the teaching-world generally. I can only record my own personal conviction that until the link between pre-literate and literate history has been forged we are not doing our respective jobs.

I am conscious, in conclusion, that I must have appeared to extol archaeology as a sort of panacea for many of the ills that the academic flesh is heir to. I can only hope that I have not over-stated my case for the fuller academic use of a subject whose additions to knowledge have been one of the outstanding features of the last few decades. There can surely be no doubt in the mind of anyone who will assess the matter dispassionately that the future holds limitless possibilities for archaeological research into the past of man—and over the whole of the habitable world. The enhanced consciousness of an ultimate one-ness which seems likely to result from this activity might in time help to steer this creature whom we call "sapiens" (for reasons that are not always clear) towards the harmony which is the only alternative to self-destruction in these modern times. Academically speaking the two-way traffic in ideas and knowledge which springs from the character of archaeology as a scientifically-based humanity seems to be its most promising feature. It is certainly the less remote target of the two. It is my hope that while promoting the study of archaeology in all other directions we shall make some progress towards that target in the years that lie immediately ahead.

Two Phases of Prehistoric Settlement in the Western Mediterranean*

By J. D. Evans

I need not this evening, I think, waste much of your time in observing the hallowed custom of protesting my unworthiness to succeed to the Chair which I have just taken up. When the sole previous occupant has been Professor Gordon Childe that is surely unnecessary—it is so self-evident that it may be taken for granted! Indeed, I comfort myself that the full extent of my personal shortcomings may perhaps be somewhat masked by the inevitability of any successor to Professor Childe being something of an anti-climax. To assume the teaching duties of the man who, perhaps more than any other, has helped to mould our conceptions of the prehistory of Europe, and indeed our very approach to the study of prehistory itself over the last thirty years is indeed a heavy responsibility. To succeed him in any other way would be as frankly impossible as it is happily unnecessary, since he is still very much with us and in no need whatever of being succeeded. May he long continue to give us the benefit of his great gifts, his learning and his personality!

By his work over the years Professor Childe has established a great tradition in the study of European prehistory, a tradition of which I should just like to mention three features out of the many which give it its individuality. First of all, in dealing with a difficult, intractable material, Professor Childe has consistently refused to see the often squalid remains of the activity of prehistoric man in Europe and the technical data about his environment as simply facts to be indexed and classified. Rather he has always used them as aids to the reconstruction of that dynamic story of the opening up of a new continent which he has so often and so graphically presented to us in his books. In matters of classification, it is true, Professor Childe has been a reformer of old systems and an originator of new ones—not, however, as an end in themselves, but in order that they might the more accurately represent and illuminate the underlying reality. Secondly, Professor Childe has again and again demonstrated to us the necessity of mastering and using in our studies the widest possible range of comparative material. Only thus can we hope to see the societies we are studying both in our own country and in Europe in their correct relationships to each other; only thus can we put the whole story of the beginnings of civilisation in Europe in its true perspective in relation to the general development of mankind. Without this broad sweep, he has seen, our study may even be

* An Inaugural Lecture given at the Institute under the Chairmanship of the Director on November 27, 1956.

deleterious, for, as we have seen so well in recent years, it is fatally easy to pervert it to political, racial or other propagandist ends. Finally, and perhaps most important of all, whilst combating prejudice and dogmatism on all sides, Professor Childe has skilfully avoided the pitfall of creating a dogmatic system of his own. He has ever been the first to assimilate and utilise new evidence regardless of whether it confirmed or contradicted his previous views. It is a commonplace, of course, that it is only thus that solidly-based advances in scientific knowledge can be achieved, but in our study practice has perhaps rarely kept pace with precept as well as in Professor Childe's writings. To what he has taught us in these and so many other ways there is little that I can hope to add. My hope is rather to work in the tradition which he has created, and to represent it perhaps a little less unworthily as the years go on.

In choosing a subject for this lecture I was much influenced by these considerations. Conscious that such an occasion most often gives the lecturer an opportunity to range broadly over his field and to offer general considerations as to the scope and value of his subject, yet at the same time feeling my role here to be rather that of continuator than originator, I hoped that my style was not so diffuse as to need a whole lecture to say so! Then again Professor Grimes has just given us, in his own inaugural lecture three weeks ago, an admirable survey of what the practical aims of the Institute should be for the immediate future. In these circumstances it seemed to me that perhaps a less ambitious, if more specialised subject might be acceptable as a variation, particularly if it were one which might serve to illustrate a few general points about the comparative study of archaeological material. I have chosen to speak about the early cultures of the Western Mediterranean not only because this is the field which I know best and in which I have worked for some time, but also because I think there are a number of new things to be said about the pattern of development in this area.

Begun promisingly in the later 19th century, research on the prehistoric cultures of this region went through something of a doldrums period between the two wars, from which it has only been rescued in the last decade or so by a spate of new activity and by the full publication of work done immediately before and during the last war. In particular Professor Brea's two great sequences at Arene Candide and in Lipari must now form the essential scaffolding for any attempt to systematise the prehistory of the area, though there is much other new work both by Brea himself and by others which must also be taken into account.

The Western Mediterranean is a region of peninsulas and islands, in which the most fertile lands are generally near the coasts. Inland we most often find mountains or high mesetas, regions of cold winters and scorchingly hot summers. As the Spaniards of the Albacete province put it: "Nueve meses de invierno, y tres meses de infierno." Little wonder then that the earliest civilisations here

tended to be coastal, and that inland we find only poor and retarded societies. Sharp contrasts in standards of living within a few miles are still characteristic of the region. Trade and movement tended to be chiefly seaborne, usually coastwise, though quite often across considerable stretches of open sea—a situation which favours the sudden transplanting of culture-traits, and of cultures themselves, over considerable distances. The difficulties to be faced in studying such an area are obvious enough, and the archaeologists have not always been equal to them. Thus, the main reasons which have sometimes distorted the results of earlier researches can, I think, be summed up as follows: (1) a too narrow, parochial approach, (2) failure to make due allowance for the possibilities of retardation and local differentiation, and (3) attempts to impose on the material an arbitrary classification designed to fit that of another area. However, though the tendency to dogmatise on insufficient evidence has been rife, it is only rarely that conclusions have been seriously affected by nationalist feeling. One might of course cite Pigorini's plan of the Terramara of Castione which became more like a Roman camp with each republication, and Ugolini's attempt to flatter the Maltese for political ends by discovering the origins of Mediterranean civilisation in their islands. But these are isolated occurrences! On the other hand, the champions of Oriental influence have tended to be somewhat ineffectual because they have generally stopped short at citing a few eastern parallels without following them up properly or attempting to trace their westward progress step by step. For the Mediterranean is a continuum culturally as it is geographically, and it must be studied as such.

As a result of the recent work to which I have referred I believe that it is now possible to discern an underlying pattern in the kaleidoscopic proliferation of small cultural groups which took place around the shores of the Western Mediterranean basin during the later third and second millennia B.C. I must emphasise that what follows is a personal evaluation of the evidence available, with some or all of which other workers in the field might not agree. I feel impelled to make it, however, because I consider that it may throw some new light on the processes at work, and help to give a direction to further research, or at least compel a re-examination of the evidence from a new angle.

Behind the variegated aspect of the Neolithic and Early Bronze Age cultures of the Western Mediterranean it is, I think, possible to discern two distinct cultural traditions. One of these arrived in the area before the other, but during a large portion of the period under consideration both are present in different parts of the region, and sometimes both in the same part at different times. The prototypes of the first group were the users of pottery with generally simple, rounded shapes, rounded bases and string-hole lugs instead of true handles, and which may be either plain or decorated with impressions made before firing. Almost everywhere, when sufficient evidence is available, we find

these people practising some form of collective burial. Out of this cultural background there grew up the earliest civilisations of coastal Spain, Portugal, Southern France, Sardinia, Malta and, in part, of Sicily also. These cultures constitute the first phase of post-Mesolithic settlement in the area. Sharply contrasting with this tradition, though interacting with it at many points and finally supplanting it over most of the region, there exists another, whose slow westward progress constitutes my second phase of settlement. The cultures which are the representatives of this at different times and in different areas of the Western Mediterranean are very various in aspect, but nevertheless they all have common traits, and they all stem from cultural traditions dominant during the later Neolithic and Early Bronze Ages in the Balkans and Greece, and which are traceable in their turn back to Anatolia and Western Asia. Many of these cultures show a preference for single burial, though others such as the Rinaldone culture in Italy and the Castelluccio culture of Sicily practised collective burial in rock-cut tombs. Representatives of this group first appear in Italy (somewhat later than the first appearance there of Phase I cultures), and from there they spread slowly westwards.

Thus we could call the cultures of the first phase the western group, and those of the second the eastern, or Aegeo-Anatolian group. However, such labels could have at best only a very relative value, since it seems likely, as we shall see, that the cultures of the first group also may go back to a hitherto little known Western Asiatic tradition which is even older than that to which the second group belongs. Ultimately the distinction between the two groups of cultures is not geographical, nor chronological, but is purely one of cultural tradition. It seems safer, therefore, to label them simply Group I and Group II respectively. Apart from certain direct influences coming from the East Mediterranean by way of trade, the cultural history of the Western Mediterranean lands throughout the late third and second millennia is chiefly the story of the interaction between cultures belonging to these two groups, and of the gradual encroachment of representatives of Group II at the expense of cultures of Group I tradition.

It is only relatively recently that we have begun to acquire some real knowledge of the first phase of settlement by pottery-using farmers and herdsmen.[1] It now seems that almost everywhere around the coasts of the Western Mediterranean these first settlers were people using pottery with decoration

[1] Recent discoveries in various areas of non-pottery-using groups practising agriculture and stock breeding, and particularly the finding by Milojčić of non-pottery levels at Argissa in Thessaly (*Germania*, 1956, pp. 208–10) naturally raise the question whether non-pottery agriculturalists may not have existed in our area at an even earlier time. Santa-Olalla perhaps hints at something of the kind in Spain in preferring the name *Neolitico antiguo* for the Spanish Mesolithic (*Esquema Paletnológico*, p. 45 ff). If this is the case, the spread of impressed pottery might well be due, at any rate in part, to a process of acculturation of pre-existing groups rather than actual movements of people. Much new work will be required to settle these problems, which for the moment can only be left open.

roughly impressed before firing. The position of these wares at the head of the sequence has now been demonstrated stratigraphically in Northern Italy at the cave of Arene Candide,[2] in Southern France at the cave of Châteauneuf-les-Martigues,[3] and, less directly, in Lipari and Malta.[4]

In other areas such evidence as we have seems to indicate that they occupied a similar position.[5] The distribution of these impressed wares has recently been studied in detail by Professor Bernabò Brea in several recent publications,[6] so that it need not detain us for long here. It will suffice to say that they are found along the Adriatic coast of Italy, from the Vibrata valley in the north to the tip of Italy's heel, and also in the Tremiti islands off the coast; in Sicily, Malta, Sardinia, Elba, North-West Italy, Southern France, Spain and Portugal. The distribution is chiefly coastal and island, implying that some form of sea-transport played a great part in the movement, though unfortunately we have at present no evidence as to what kind of vessels were used. Both agriculture and herding seem to have played a part in their economy, though the relative importance of each may have varied from group to group. In the Spanish impressed ware groups stock breeding seems to have been much the most important. The aspect of the flint industry varies from area to area, doubtless due to whether or not mixture had taken place with surviving Mesolithic groups.

Until recently it was taken for granted that the impressed ware people reached Europe from Northern Africa, a position still supported by Professor San Valero, and Professor Santa Olalla in Spain.[7] There is, however, a still relatively small, but growing, amount of evidence that this may not be the case—at least that it is not the whole story. Professor Bernabò Brea in recent studies has been able to point to a certain amount of pottery from sites in the Balkans, Greece,[8] and Western Asia which suggest that at any rate part of the spread may have been through the lands along the northern coast of the Mediterranean. Pottery with crude impressed decoration has appeared in the lowest levels of many sites in Iraq and Syria,[9] whilst at Byblos in the Lebanon

[2] L. Bernabò Brea, *Gli scavi nella caverna delle Arene Candide*, Parte I, Tom. 1, Bordighera, 1946.

[3] Escalon de Fonton, *Préhistoire*, 12, pp. 41 ff.

[4] Brea and Cavalier, *Civiltà preistoriche delle isole eolie e in territorio di Milazzo*, Roma, 1956, pp. 15, 16; J. D. Evans, *The Prehistoric Culture-Sequence in the Maltese Archipelago*, P.P.S., 1953, pp. 44, 45.

[5] For instance, they occur unmixed with painted wares and below Bronze Age levels at Coppa Nevigata (Puglisi's recent excavation) and at the cave of El Pany in Catalonia they were stratified below a level with Beakers (Grivé, *Annuari de l'Inst. d'Estudis Catalans*, Vol. VIII, pp. 19 ff.).

[6] *Il Neolitico a ceramica impressa e la sua diffusione nel Mediterraneo*, Riv. internaz. di studi liguri, 1950; *La Sicilia prehistórica y sus relaciones con Oriente y con la Península Iberica*, Madrid, 1954; *Gli scavi nella caverna delle Arene Candide*, Parte I, Tom. 2, Bordighera, 1956.

[7] San Valero, *El Neolítico español y sus relaciones*, Cuadernos de Historia Primitiva, Ano I, No. 1, pp. 1–29; Santa Olalla, *Esquema*, pp. 53 ff.

[8] The material from Greece has been much augmented by the recent German excavations in Thessaly. See Milojčić, *Arch. Anzeiger*, 1954, pp. 1–28.

[9] Brea, *op. cit.*

the earliest culture found by Dr. Dunand seems to have good analogies with both impressed wares and the early Danubian wares of Central Europe.[10] At Mersin in Cilicia we again meet a culture with impressed pottery in the lowest levels,[11] which is strongly reminiscent of some western impressed pottery, particularly some of the decorative motifs, such as the curvilinear, zig-zag and panels of finger-nail impressions. Here for the moment the trail peters out, for no trace has yet been found of impressed pottery in the rest of Anatolia, or in Cyprus. It picks up again, however, in Greece, with remains of what Milojčić calls the pre-Sesklo culture,[12] and particularly on islands off the western coast of Greece, e.g. Levkas, whilst in Serbia the earliest culture, that of Starčevo, is also characterised by impressed wares which in the earliest phase seem to be unaccompanied by painted wares.[13] Whilst the possibility of a Northern Mediterranean route is thus gaining strength, it is also true that some groups of the impressed ware people in Spain have strong African affinities (for instance, in the frequent occurrence of the pointed base in pottery), though again others (e.g. that represented at the Cueva de la Sarsa)[14] have much in common with the Sicilian Stentinello culture, which seems unlikely to have been derived from Africa. The Sarsa materials in particular also show considerable affinities to the Starčevo/Körös group of the Balkans. It seems possible, therefore, that we may have to reckon with the possibility of a twofold movement from the east, along both the northern and southern shores of the Mediterranean with the divergent traditions meeting and mingling in Spain. However, a very great deal of work will have to be done in many areas before we shall be in a position finally to resolve this problem, and I have no wish to dwell on it further at present.

More interesting in the present connection is the question of the relationship of these early Western Mediterranean impressed ware groups to the other early groups in the same region who used plain wares—the plain "Western" leathery pottery! This question has still to be satisfactorily settled, but it is becoming clear, I think, that this distinction is not nearly so complete as it was assumed to be in the days when the Spanish impressed ware cultures had not yet been differentiated from the miscellaneous material belonging to groups of retarded pastoralists which helped to make up Bosch i Gimpera's "Cave Cultures." The following points may help to show just how close in fact this relationship turns out to be.

Professor Bernabò Brea has emphasised recently the little-known fact

[10] *Rev. Bibl.* 1950, pp. 582 ff., and lecture delivered at London University, November 1956.
[11] Garstang, *Prehistoric Mersin*, pp. 18 ff and figs. 10, 11.
[12] Milojčić, *Chronologie der Jungeren Steinzeit Mittel u. Südosteuropas*, München, 1949, p. 38.
[13] Milojčić, *B.S.A.*, 1949, p. 262; D. Arandjelović-Garašanin, *Starčevačka Kultura*, Beograd, p. 166. The latter says, however, that there are traces of paint on some sherds.
[14] San Valero, *La Cueva de la Sarsa*, Valencia, 1950.

that much of the Stentinello pottery of Sicily is only lightly decorated, or undecorated,[15] whilst at Arene Candide he found a plain, burnished ware associated in the lowest levels with the fragments with impressed decoration, which were generally coarser.[16] Escalon de Fonton insists that this plain ware at Arene Candide is in fact an early Lagozza.[17] In France plain and impressed wares have not yet been found stratified together, but Professor Stuart Piggott considers that the French impressed wares are in fact probably contemporary with the earliest Chassey plain wares.[18] We must always allow for the tendency of early excavators to disregard plain sherds in favour of decorated ones. Escalon de Fonton's recent sequence at Châteauneuf-les-Martigues seems to indicate that at least in some areas of France impressed decoration survived very late, and the presence of impressed sherds in the cave of Rocadour, 250 miles from the coast, might be taken as indicating the same. The distinction between plain and impressed wares has always seemed most absolute in the Iberian Peninsula, but in fact I think it is less so than is generally supposed, being most obvious in groups which are already somewhat specialised. It is true that we find in Iberia a difference in distribution—the plain ware groups occupying chiefly the coastal plains, and being probably more dependent on agriculture, whilst the impressed ware users kept to the mountains of the coastal ranges and were chiefly herdsmen.

Nevertheless, the early plain ware people seem to have had a good deal in common with the impressed ware groups. In flint, transverse arrow-heads and short blades are common to both, as also are polished stone axes with a rounded section. The rectangular-sectioned stone axe, which Santa Olalla uses to reinforce the distinction between the groups,[19] was probably made later by the more progressive plain ware people in imitation of copper axes. There are several shapes in the pottery which are common to the impressed wares and the plain wares of the peninsula, and these are shared also with the Stentinello impressed wares of Sicily, as was pointed out recently by Brea,[20] and with the early pottery of Malta, which is derived from the impressed wares. Pottery spoons with unpierced handles are also common to the early Maltese culture, Stentinello, Arene Candide I, early Cortaillod, Lagozza and Chassey, and the plain ware groups of Spain. They occur also in the Körös complex. So far as I know, they are lacking in the impressed ware sites in Spain, but bone objects occur at the Cueva de la Sarsa, which might either be versions of them,

[15] *La Sicilia*, etc., pp. 144–5.
[16] *Arene Candide*, Parte I, Vol. 1, p. 38.
[17] Escalon de Fonton, *Les stratigraphies du Mont-Bego et la Civilisation de la Lagozza*, Bulletin du Musée d'Anthropologie Préhistorique de Monaco, Fasc. 2, 1955.
[18] *Le Néol. Occidentale et le Chalcolithique en France; esquisse preliminaire*, L'Anthropologie, T. 57, 1953, p. 407.
[19] Santa-Olalla, *Esquema*, p. 55.
[20] *La Sicilia*, etc., p. 145.

or versions of the bone spatulae found in the Starčevo-Körös groups of the Balkans.[21] In Catalonia plain wares were found with the impressed wares in the Montserrat caves, but it is impossible to say whether they were contemporary or not.[22] A fragment of perfectly good impressed ware was, however, found by the Leisners, along with plain wares, in an early dolmen in the Reguengos district of Portugal,[23] and sherds of impressed ware turned up also at the settlement of Vilanova de San Pedro.[24]

Nevertheless, until recently it seemed almost axiomatic that impressed wares and megaliths did not go together.[25] Megalithic phenomena appeared to be associated chiefly with the groups using either plain pottery or pottery decorated with patterns scratched after firing. However, the establishment and correlation of sequences of pottery and megalithic temples in Malta now presents us with the spectacle of impressed ware people who were also builders of imposing megalithic monuments. Late types of impressed and cut-out wares were found around and under the foundations of a small temple at Mgarr, whilst a larger monument on the same site was shown to date from a phase when pottery was used which is still directly in the same tradition. Since all the later ceramic and architectural developments in the Maltese islands during period I can be shown to stem directly from this background, it seems that the association of impressed wares with megaliths is here proved beyond a doubt.

But granted that the impressed and plain ware groups are in some way fundamentally related, is there any common denominator which can unite the dolmens of Portugal, the round graves of Almería, the rock-cut tombs of Sardinia, and the rock-tombs and megalithic temples of Malta? I think perhaps that if we forget for a moment the differences in form and construction of the tombs and concentrate simply on the rite which they all serve—that of collective burial—we have a possible key. In Malta I recently excavated a group of rock-cut tombs of Period I[26] which in plan so closely resemble the earliest megalithic temple at Mgarr as to suggest that the latter might possibly have originated in an attempt to reproduce the form of a rock-cut tomb above ground (Figs. 1 and 2). The rock-tombs themselves may well have originated in Malta out of the attempt to reproduce natural caves. The earliest impressed

[21] San Valero, *op. cit.*, pl. 1.

[22] Colominas Roca, *Prehistòria de Montserrat*, Montserrat, 1926.

[23] *Antas do Concelho de Reguengos de Monsaraz*, Lisboa, 1951, pl. LIX, 2 (on right).

[24] Jalhay and do Paço, *El Castro de Vilanova de San Pedro*, Actas y Memorias de la Soc. Esp. de Antr., Etnol. y Prehistoria, Vol. XX, pl. XXV, Nos. 5 and 7.

[25] In a recent article a French archaeologist went so far as to dismiss a report of impressed wares having been found in a gallery grave because megalithic monuments are later than impressed pottery. It could therefore not be found in a megalith at all, and *a fortiori* not in a gallery grave. This may be logical, but it is scarcely good inductive reasoning!

[26] On Xemxija Height, overlooking St. Paul's Bay. See pl. I, a, and pl. IV, b.

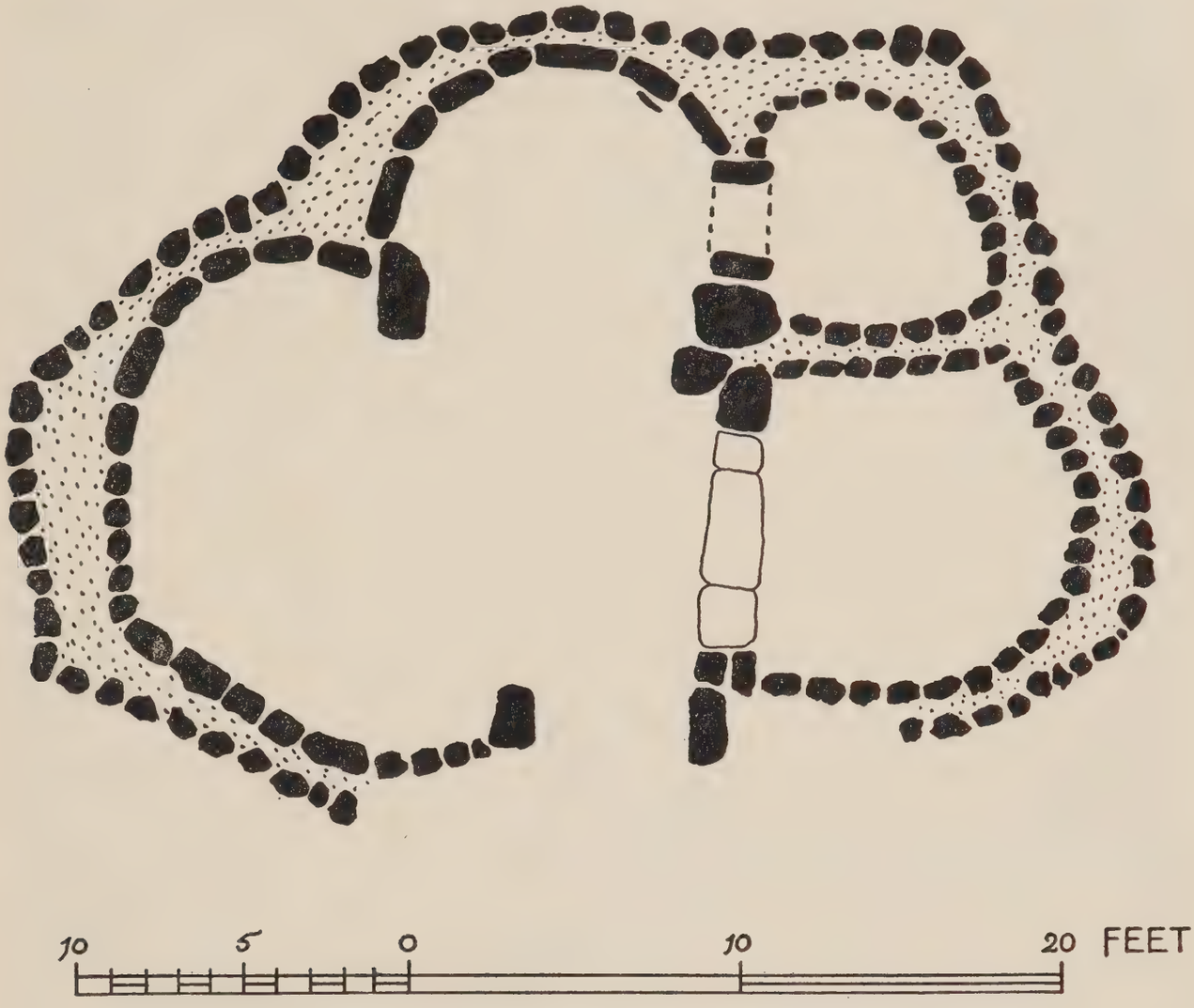


Fig. 1. The oldest Temple at Mgarr, Malta

pottery from Malta comes mostly from a natural cave, Ghar Dalam, in which burials occurred, though of uncertain date. Much later in Period I, however, another natural cave—Bur Mghez—was certainly used for burial and others probably were also.[27] Once the idea of collective burial is present, both rock-tombs and megalithic monuments may develop naturally in suitable areas without the need to invoke special introduction from abroad. That the course of this development may later be affected by foreign influence, as it undoubtedly was in Malta, does not harm the main thesis.

Despite a lack of good excavations of cave sites, it is possible to affirm that collective burial in natural caves was certainly a normal practice of the impressed ware people of Spain, and it seems that caves in Southern France and

[27] Tagliaferro, *Arch. Melit.*, Vol. I, 1911, pp. 143–9.

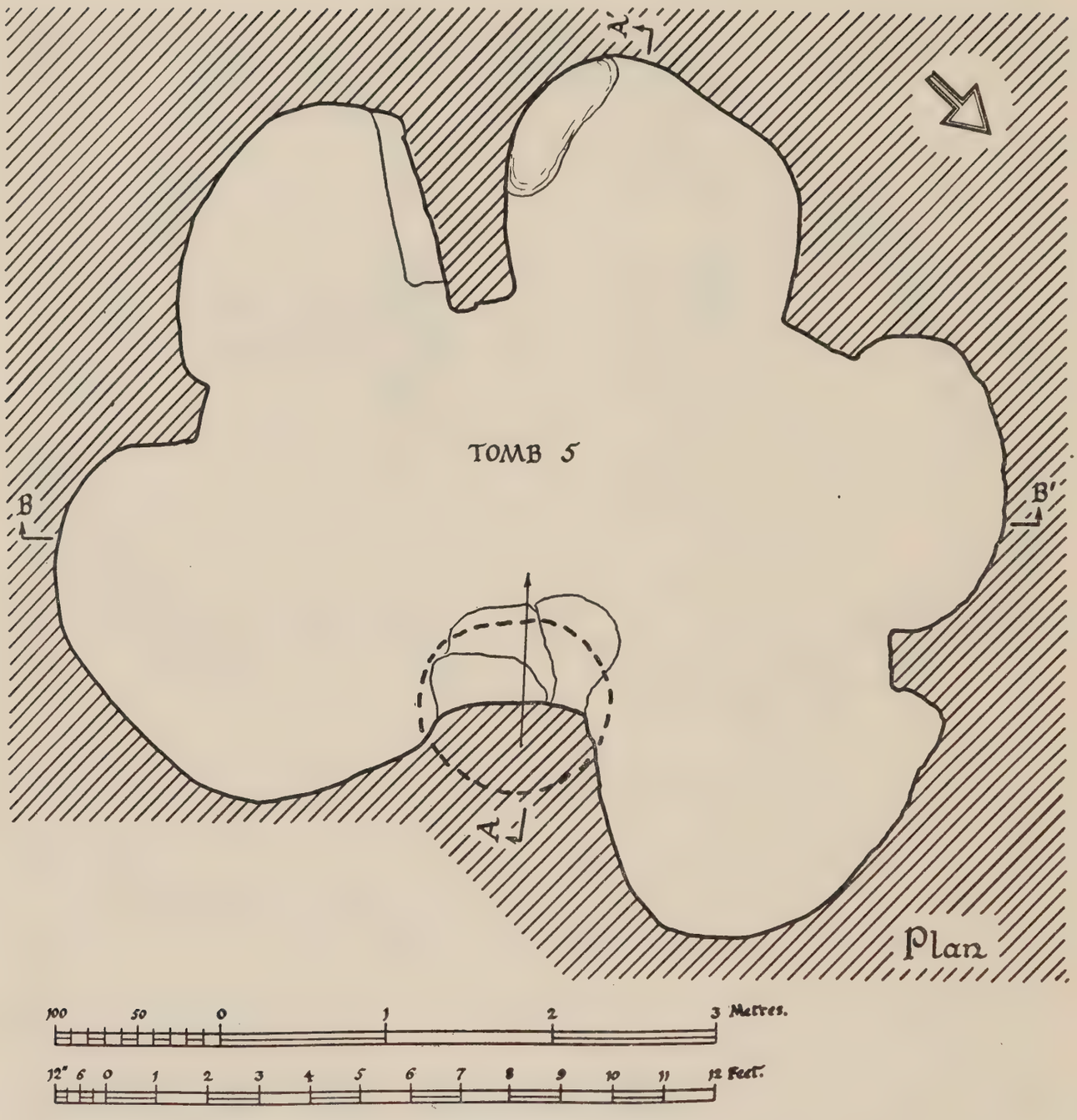


Fig. 2. Tomb 5, Xemxija, Malta

Liguria were employed for the same purpose. In Spain we find, also, that in regions dominated by plain ware groups where for some reason megalithic or rock-cut monuments failed to develop, collective burial in natural caves was the natural practice of plain ware groups into the advanced Copper Age—e.g. in parts of Murcia, Valencia and Southern Catalonia. In France, too, collective burial in natural caves long survived the disappearance of impressed wares and endured throughout the long "Chalcolithic" there, side by side with

various forms of collective tombs, rock-cut or megalithic. It seems reasonable, therefore, that we should regard the various groups of rock-cut and megalithic tombs which developed among the cultures of Group I as the product of a number of separate lines of evolution starting from the same basic tradition. We have also, of course, to reckon with complications introduced by the mutual influence exercised by some of these groups on each other, and also, in some cases, with influence from further afield—from cultures of Group II type, or even direct from the Aegean world.

These later developments of the Group I culture make a complex and fascinating story, which I cannot follow up this evening for lack of time. I must rather pass on to make a rapid survey of what I conceive to be the role played by the Group II cultures in the development of the Western Mediterranean during the second millennium. Cultures of Group II type establish themselves early in Italy. In the north they are represented by the Chiozza culture,[28] which at Arene Candide supersedes the impressed wares of the lowest layers. Characterised by vases of fine polished ware, often with little triangular lobes rising from the rim, by the presence of true handles, square-mouthed and quadrilobate mouthed vases, pintaderas, clay spoons with perforated handles (*vases à tuyau*), and perforated cheese-strainers, it has obvious Balkan and Danubian affinities. An individual feature, however, is the use of decoration scratched after firing, like that which accompanies the early painted wares of Southern Italy. This culture is traceable in Italy from near Trieste in the east to the Ligurian area, and traces have been found further west. For instance, in France, at the Châteauneuf cave, a so-called Ripoli handle and spoons with pierced handle are reported.[29] The well-known clay idols from Fort Harrouard look much more like those found in this level at Arene Candide than anything else in the area. In Catalonia Bernabò Brea noticed a square-mouthed vase among the material from a small cemetery of single graves near Sabadell, and another from the Cova de les Gralles, near Tarragona.[30] There are also one or two other square-mouthed and quadrilobate vases from Catalan dolmens, but they are of later date. This, however, may not represent the full extent of Chiozza penetration into Spain. The habitation site discovered at Cantarranas, near the University City, Madrid, is usually regarded by Spanish archaeologists as belonging to the "Almerian" or Spanish plain ware group. In fact, it produced most un-Almerian things—a cheese-strainer, a *vase a tuyau*, a beaker-shaped vase with a strap handle and some decorated sherds which seemingly resemble Chiozza types. A square-mouthed

[28] Named after the site of Chiozza di Scandiano. See Laviosa Zambotti, *Le più antiche culture agricole europee*, Milan, 1943, pp. 75–92.

[29] Escalon de Fonton, *op. cit.*, p. 253.

[30] *Le culture preistoriche della Francia meridionale e della Catalogna e la successione stratigrafica delle Arene Candide*, Riv. internaz. di studi liguri, Anno XV, N. 1–2, Fig. 3, 3.

vase is also reported from Portugal, and I know of another, from a local site, in the museum of Granada.

Further down the Adriatic coast of Italy we begin to come upon painted ware cultures which mingle with and finally supplant the older impressed wares: first the well-marked Ripoli culture with its centre in the Vibrata valley,[31] then the Apulian painted pottery, culminating in the fine painted ware of Serra d'Alto type.[32] On the Tyrrhenian coast we find Capri wares with flame-like patterns and also some examples of typical Ripoli wares.[33] Some of the Balkan and Greek affinities of these groups have been indicated by Stevenson and Bernabò Brea following Peet, Mayer and Frankfort, but the question is one which has yet to be studied in detail. Some of these wares penetrate south-west to Sicily and even have some little influence in Malta. A little later new painted wares of Serraferlicchio type appear in Sicily, coming, it would seem, from some part of Greece, but by-passing Italy. Once again, however, it seems that the force of the movement did not entirely spend itself in reaching the Central Mediterranean, for one or two relatively recent discoveries seem to indicate that at any rate a few of these painted pottery people may have reached the western end of the Mediterranean near the Straits of Gibraltar. Three years ago Taradell found painted pottery in a cave site (Gar Cahal) on the coast of Spanish Morocco, near Gibraltar.[34] One of these sherds was in colouring and decoration (black on red slip) very close to the most common type of Serraferlicchio painted ware. Some years earlier (1945) there was published pottery from the lowest levels of the Mesas de Asta site near Jerez in the Guadalquivir valley,[35] Professor Childe has pointed out that some pattern-burnished wares from this site have Balkan parallels and that the painted wares can be paralleled in Western Greece.[36] Even closer parallels can be found for the latter in Italy, however. Pattern-burnishing occurs there also, and I should particularly like to mention one painted sherd from Mesas de Asta which has a typical Ripoli pattern—a panel of red paint, a line of painted dots and panels of thin diagonals (Pl. IIB, 4; cp. Pl. IIA, 1). These painted and pattern-burnished wares are found at Mesas de Asta with sherds of Beaker ware of the Carmona and Palmella type. I do not wish here to touch directly on the complex problems connected with Mediterranean Beakers, but it seems worth recalling here that some years back Professor Santa Olalla called attention to some exotic elements in the shapes and decoration of the Carmona

[31] Rellini, *La più antica ceramica dipinta in Italia*, Coll. Meridionale Editrice, Roma.

[32] Stevenson, *The Neolithic Cultures of South-East Italy*, P.P.S., 1947, pp. 85–100.

[33] Rellini, *La grotta delle Felci a Capri*, Mon. Ant., XXIX, 1923.

[34] Taradell, *Germania*, 1955, pp. 23 ff.

[35] M. Esteve Guerrero, *Excavaciones de Astas Regia (Mesas de Asta, Jerez) Campaña de 1945–6*, Informes y Memorias, No. 22, 1950.

[36] *Prehistoric Migrations*, pp. 74 f.

"Beaker" pottery and compared them with pottery from Anatolia and Western Asia.[37] Some of these parallels were striking, but he indicated no mechanism by which the gap between Western Asia and Spain could be bridged. Perhaps here we have some indication of how it might have occurred. The fruit stands which occur at El Acebuchal and S. Pedro de Estoril are a distinctly Balkan or Anatolian feature, whilst the striking "Maltese cross" motif which occurs on the Carmona vases[38] can also be found in the Central Mediterranean—on Castelluccio pottery in Sicily and Tarxien Cemetery pottery in Malta, and can be traced back through Greece to the Cappadocian painted pottery of third millennium Anatolia.[39]

There is certainly an exotic element in this elaborately decorated pottery of the Guadalquivir valley and the Tagus estuary, expressed in the strange shapes and decoration, so completely unlike what we normally call Beakers. The painted pottery of Mesas de Asta may give us a hint of the direction from which it could have come to Southern Spain. Is the association of these wares with real bell-beakers merely accidental?[40] Here might be a profitable field for further investigation.[41]

Another interesting possibility of interaction between Group I and Group II cultures is presented by the spread of scratched decoration. This is known in Southern Italy on wares which appear to be contemporary with some of the painted wares, and which Stevenson assigns to his Period II. A closely related type of scratched ware is found in the Chiozza culture of Northern Italy. Laviosa-Zambotti considers that this scratched decoration probably originated somewhere in Southern Italy, since the wares on which it occurs

[37] Santa-Olalla, *Obras maestras hispánicas de la ceramica de estilo campaniforme*, Cuadernos de Historia Primitiva, Año II, No. 2.

[38] Santa-Olalla, *op. cit.*, pl. VIII.

[39] J. D. Evans, *The 'Dolmens' of Malta and the Origins of the Tarxien Cemetery Culture*, P.P.S., 1956, Fig. 5.

[40] Sangmeister and do Paço, in an article on Vilanova de San Pedro (*Germania*, 1956, pp. 211–30), have now suggested linking the people of the "level with exotic pottery" at that site with those which produced painted sherds at Mesas de Asta and Gar Cahal. At Vilanova, however, according to Sangmeister, the Beakers would belong to a later level.

[41] Although the theory of the Iberian origin of Beakers has achieved a kind of dubious respectability over the years, the Peninsula remains a very poor candidate as the cradle of a "Beaker people." There are many Beakers, but no "Beaker Culture" in Spain and Portugal, and certain types of Beaker can be shown not to have their origins there. For example, Corded Beakers, though occurring in the Pyrenees and once on the north-east coast of Spain, have never been claimed as a Spanish type. Another variety which seems unlikely to be Spanish, since it occurs only in Catalonia, is the type decorated with zones in which a series of lozenges is left blank (e.g. Menendez Pidal, *Historia de España*, Vol. I, Part 1, Fig. 528). Beakers with this decoration seem to have their main centre in Bohemia and Moravia; they are found in Sardinia to the south, but also in Britain to the west and Denmark to the north. On the evidence, it would be as rational to claim them for Denmark as for Spain! Both the types mentioned seem, in fact, likely to be native to Central Europe, where, at any rate, we do find a recognisable "Beaker complex," and, as Childe pointed out (*Danube*, p. 49), a possible prototype for the Beaker shape itself and the zoned decoration (though not the distinctive red ware) in a certain kind of Danubian pot. This is a good deal more than the Peninsula can furnish us with! However, it is little enough, and the problem is one which cries out for fresh study.

have Balkan affinities, though the technique itself is unknown in that area.[42] This scratched decoration, with its ladder patterns and hatched triangles, lozenges, and rectangles has obvious affinities with the decorated Chassey wares of France and certainly suggests the possibility that the Chassey decoration may have been at any rate partly derived from the northern representatives

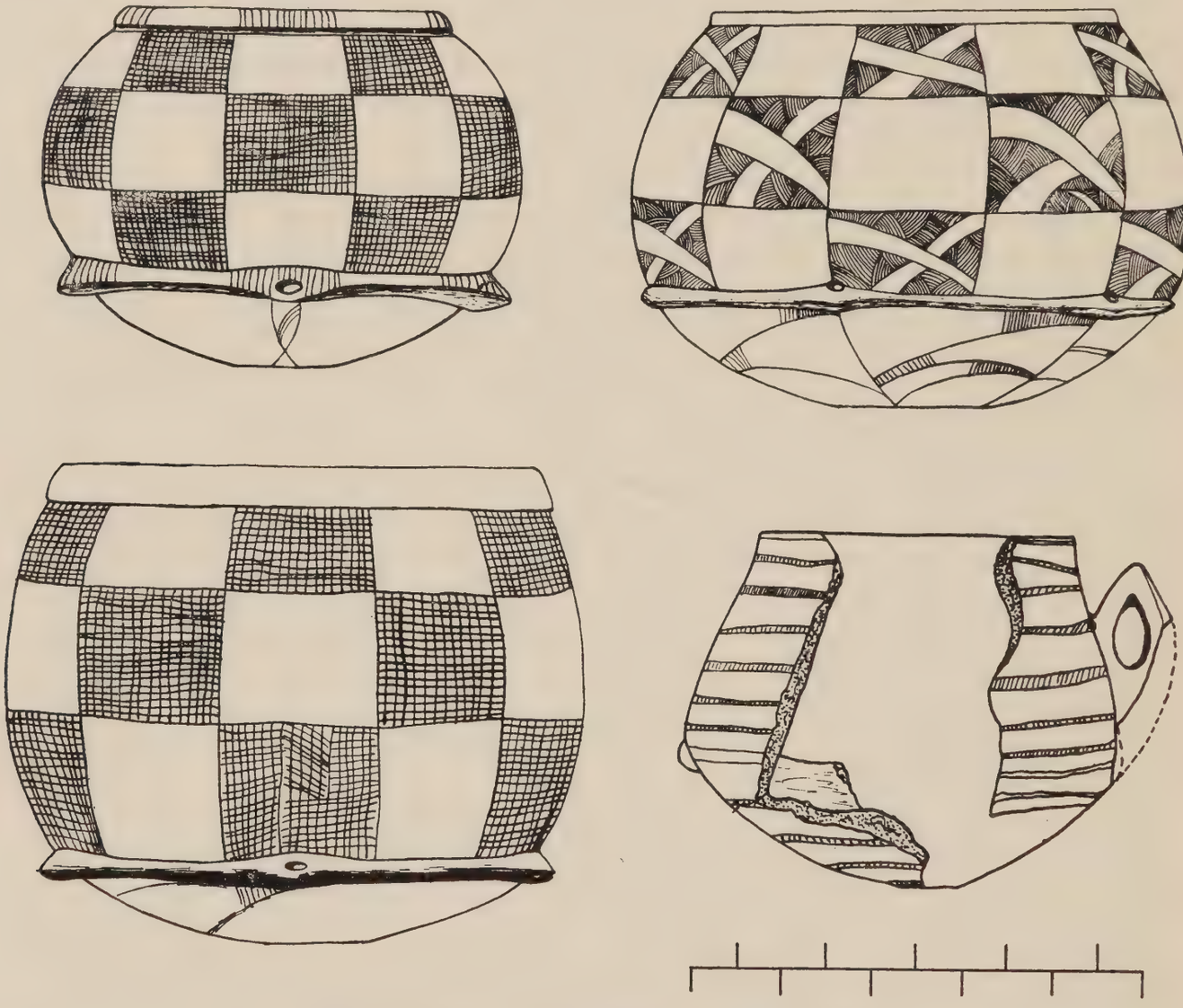


Fig. 3. Pottery from tombs at Xemxija, Malta

of this Italian pottery. More interesting still, recent finds in Malta suggest that the introduction of scratched decoration there may owe something to the Southern Italian scratched wares. The rock-cut tombs at Xemxija, near St. Paul's Bay, produced a large number of sherds of almost globular vases with a remarkable scratched decoration. It was possible to reconstruct a few of these vases. The upper part is covered with a chess-board pattern of hatched squares

[42] *Op. cit.*, p. 364.

and rectangles, quite alien to the traditional curvilinear incised decoration of Malta, whilst on the base are "comet" patterns typical of the I *b* phase of the temple-culture (Fig. 3). The latter are simply developments of the more heavily incised patterns of the preceding phase executed in the new technique, but the rectilinear patterns suggest possibly some direct influence from Southern Italy, as do some of the new pottery shapes of phase I *b* such as the globular vases themselves and *vasi a tocco* with broad tronco-conic necks and flattened bodies, which are both typical of the Southern Italian scratched and painted wares.[43] The chronological problems which this new evidence raises cannot be discussed here, and in any case seem unlikely to be resolved before we know more about this sequence in Southern Italy, but the probability of a connection existing seems very high.[44]

This first expansion of cultures of the Group II type seems to be followed by a partial recession. In Spain the influences are absorbed into a strong Group I tradition; in Malta such traces as it left soon faded away, to be replaced in the next phase (I *c*) by strong Greek and Aegean influence of Minoan/Mycenean type; whilst at Arene Candide the Chiozza culture was replaced by a culture of definite Group I type, in the form of a developed Lagozza. The following phase marks the apogee of the various cultures of Group I tradition. In Spain and Portugal the Los Millares and Palmella cultures flourish, in Southern France and North-Western Italy the Chassey and Lagozza cultures reach their highest development. In Sardinia we have the culture of Anghelu Ruju, of somewhat mixed (I/II) tradition, whilst in Malta the temple culture enters on its period of greatest splendour prior to its sudden and complete extinction.

In South-Eastern Spain and Malta this period is brought to an abrupt end by the sudden appearance of cultures of alien tradition, those of El Argar and the Tarxien Cemetery respectively; cultures of very different aspect in many ways, but both readily classifiable as cultures of Group II type. In both cases their arrival synchronises with the abrupt disappearance of the earlier cultures. These events are symptomatic of a renewed westward expansion of cultures of Group II type, and they are the most clear-cut and unequivocal examples of it. In Catalonia, Southern France, Liguria, and Sardinia, the process is more gradual, but nevertheless clearly detectable, taking the form of a gradual transformation rather than a sudden substitution. In some of these areas, most notably in Southern France and Catalonia, many of the traits of the Group I cultures persist until the arrival of Urnfield groups in the early

[43] For these shapes see Stevenson, *op. cit.*, pl. II, 1, 5 and pl. II, 2 and cp. J. D. Evans, *Prehistoric Culture-Sequence*, Fig. 8, No. 29.

[44] I cannot but think that Stevenson has limited the chronological range of scratched wares too closely in confining them to his Period II. Puglisi's sequence at the Grotta delle Erbe gives some support to this (*Rev. di Scienze Preistoriche*, Vol. VIII, 1, 2).

first millennium B.C. Since it is impossible here to deal fully with the whole movement, and since I have dealt in detail with the origins of the Tarxien Cemetery culture in a recent paper,[45] I shall take the culture of El Argar as representative of this phase and proceed to analyse it briefly to illustrate my argument.

The mystery with which the appearance of this Bronze Age culture in South-East Spain has always been surrounded has been due in my opinion to a fundamental misunderstanding of its nature. This misunderstanding, which goes back to its original discoverer, Siret, is based upon two assumptions: the first, that its origin in the Peninsula can be traced to some single cause, whether evolution or invasion; the second, that its primary focus is in the south-east, Almeria and Murcia, and that all other so-called Argaric groups in Spain and Portugal are necessarily derived from this "nuclear" Argar culture of Almeria. Bosch i Gimpera held this view in its most extreme form, but even Taradell, who made a serious study of the culture a few years ago is still in its trammels. He recognises widely divergent regional groups, but still clings to the unnecessary assumption that they all must have originated from the Almerian one.

My own view is that the Argaric Bronze Age culture of Almeria and Murcia arose from a combination of influences and elements drawn from widely divergent areas, which form an apparent unity only because they mostly go back ultimately to the Aegeo-Anatolian traditions of the Group II cultures. There may well also have been some survival of Copper Age traditions. This, however, only shows up in Almeria in the more utilitarian elements of the culture, though further north it produced definitely mixed communities, such as that of Cabezo Redondo (Villena), which embodies a fusion of the older culture with the newly arrived Group II elements.[46] In Almeria and Murcia, however, the change is more striking, not only in the matter of pottery and other equipment, but in religion, as manifested by the disappearance of the elaborate ritual paraphernalia of the Los Millares culture, and in burial rites, with the substitution of burial singly or in twos in large jars or small stone cists, in place of the previous collective burial in tholoi or caves. These differences in my opinion rule out all possibility of an evolution from the Los Millares culture, but they do not necessarily imply that the new culture came to South-East Spain as a pre-existing unity.

In fact, if we look objectively at the equipment of the El Argar culture, there is little difficulty in recognising the sources of most of it. The typical carinated pottery forms can be derived ultimately from the Polada tradition of North-East Italy. Laviosa-Zambotti has shown how a version of the carinated

[45] See above, p. 61, note 39.

[46] J. M. Soler García, *El Poblado Prehistorico del "Cabezo Redondo,"* Publicado en el Programa Oficial que edita la Comisión de Fiestas 1949 del Ayuntamiento de Villena.

Polada bowl with nose-bridge handle spread to Southern France.[47] Later *ad ascia* and thumb-grip handles of Italian Bronze Age type follow. This carinated, handled pottery penetrated also into Catalonia, and, I believe, spread from there down the east coast of Spain. In the Valencia region this so-called Argaric pottery still has handles, albeit simple ones, and it sometimes carries an incised decoration of loops and dots which seems typically Catalan. Further south again in the "nuclear" Argaric culture handles are largely lost, but fragments with handles did turn up on some of the classical sites, such as El Argar itself and El Oficio, as also did a few sherds with the previously mentioned "Catalan" decoration.[48]

In support of this derivation of the basic Argaric pot-shape from the north we may add that some other aspects of the culture seem to have northern and north-eastern connections. The use of prismatic or pyramidal V-perforated buttons, for instance, is symptomatic, for these are found chiefly in the Catalan Megalithic culture and in the Balearics,[49] whilst the Los Millares culture used conical V-perforated buttons.[50] A bone awl from El Argar has a feeble attempt at a decoration of incised concentric circles[51]—a decoration typically used on bone objects in Catalonia, the Balearics and the Terramara area. A stepped conical forehead ornament of silver from El Argar has an exact parallel in bronze from Montepelato, Parma[52] and bone buttons of similar shape have turned up in a Terramara and in a rock-cut tomb in Mallorca.[53] The metal industry, too, has pre-dominantly north-eastern connections. There are numerous parallels with the Eneolithic and Tm. I industries of Northern Italy.[54] They range from the simple knives and knife-daggers, all the main forms of which can be paralleled in the Tm., through dagger blades which are closely similar to those which in the Tm. and Central Europe often have a metal hilt, to rather degenerate versions of the Peschiera dagger, one of which was hafted as a halberd at El Argar.[55] Some pins found at the same site look very like Terramara types, but Siret thought they belonged to a later phase.[56] The halberds, so distinctive a feature of Argaric sites, were probably, I think, derived from Central Europe,

[47] *La Ceramica della Lagozza*, etc., Bull. Pal. It., 1940, p. 135, and Fig. 68.

[48] Siret, *Les Premiers Âges du Metal dans le Sud-Est de l'Espagne*, Album.

[49] Pericot, *Los Sepulcros Megalíticos Catalanes y la Cultura Pirenaica*, Segunda Edición, Barcelona, 1950, Fig. 59; Veny, *La necropolis de la cueva de "Sa Cometa dels Morts," cerca de Lluch (Mallorca)*, Fig. 1.

[50] Prismatic or pyramidal buttons have turned up exceptionally on Bronze Age I sites further south—e.g. one from Almizaraque (probably a late site) and another from Navarrés (Valencia), where it occurred in the uppermost level where material may have been mixed.

[51] Siret, *op. cit.*, pl. 25, 69.

[52] Siret, *op. cit.*, pl. 34, 678; Montelius, *La Civilisation Primitive en Italie*, pl. 35, 16.

[53] Säflund, *Le Terremare*, pl. 65, 9; Hemp, *Archaeologia*, 76, p. 130, fig. 5.

[54] A comparison of the types illustrated by Siret with those illustrated by Säflund will show the range of this parallelism.

[55] Siret, *op. cit.*, pl. 33, 575. Other examples of this type from Spain are one now in the Granada Museum, and one from Ecija, Seville, in the Ashmolean.

[56] Siret, *op. cit.*, pl. 25, 36 and 37.

via Italian Eneolithic types. Sporadic finds of halberds have been made right down the east coast of Spain from the Pyrenees southward, and both these and the simpler Argaric types of Almeria and Murcia offer no peculiarities which would make such a derivation impossible. The more specialised Argaric types with broad butt were probably a later development with the intention of improving the hafting arrangements. A similar development took place (almost certainly independently) in the Irish halberds.[57]

One or two elements in the Argaric repertoire of metal weapons seem possibly to have had a north-western rather than a north-eastern derivation. Such are the daggers with nearly straight butts, and up to six rivets, which seem to correspond to Miss Sandars's definition of the Armorican dagger. One of them even has a rudimentary tang like these.[58] This connection is of interest when we come to consider the so-called Argaric sword itself. About fifteen of these are now known in the Peninsula, plus four pictorial representations of similar weapons on grave-slabs in Southern Portugal.[59] Of these only two are from sites in South-Eastern Spain.[60] Scattered examples were found on the southern and central meseta, but the greatest concentration is in the north-west; three together from a cave near Santander[61] and four from sites in Galicia.[62] There are good parallels to these swords from North-West France. Basically they can be regarded as elongations of the Breton type of dagger, as Miss Sandars remarks that the early Breton swords themselves are.[63] MacWhite has already postulated a proto-Atlantic Bronze Age for this region of Spain,[64] and I see no reason why we cannot regard this type of sword as having been introduced into the Peninsula by trade with the north-west.

[57] The well-known Iberian flint halberds were almost certainly, like the fine flint daggers in the Peninsula and elsewhere, copies of metal weapons. It is interesting in this connection to note that in both Spain and Portugal these flint halberds occur just outside the area occupied by cultures of Argaric type. See O'Riordain's distribution map in *Archaeologia*. The metal-bladed halberd is most likely to have originated, not from a flint prototype, but in an area where the battle-axe was a traditional weapon, and the idea of hafting copper dagger-blades for use in a similar manner would therefore come naturally. Hence a Central European origin seems likely—perhaps in Saxo-Thuringia, which was a centre both for stone battle axes and metal halberds. The occurrence of the halberd in China would also offer less difficulty if this explanation of its origin were to be accepted.

[58] Siret, *op. cit.*, pl. 32, 449.

[59] For illustrations of these see Vasconcelhos. *O Arch. Port.*, XI, 1906, pp. 179–89 and Heleno, *Tampas sepulcrais insculturadas de época do bronze*, Lisboa, 1933.

[60] Three others have provenances on the fringe of the Argaric area, in the provinces of Jaen, Granada and Ciudad Real. I leave out of account the short sword with rounded-off blade from El Argar, which Siret thought a poor local imitation. It is worth noting that Siret himself thought the finer examples were imports into the Argaric area, since he considered the techniques of the Argaric metalworkers inadequate to produce them.

[61] First published by the Conde de la Vega del Hoz, *La Espada Española*, Madrid, 1914. Illustrated by Menendez Pidal, *Historia de España*, Vol. I, Pt. 1, Fig. 610.

[62] From Ronfeiro, Orense; Melide; Portomouro; and Moaña, Pontevedra.

[63] N. K. Sandars, *Daggers as Type-Fossils in the French Early Bronze Age*, Sixth Annual Report, University of London Institute of Archaeology, p. 58

[64] MacWhite, *Estudios sobre las relaciones atlánticas de la península ibérica en la Edad del Bronce*, Disertaciones Matritenses, II, Madrid, 1951.

So far we have a culture of basically north-eastern (Catalan and Italian) affinities which perhaps acquired some few traits from contact with the cultures of the north-west of the peninsula. But whilst this suffices to explain the so-called Argaric of Valencia, it is not wholly satisfactory in the case of the "nuclear" Argaric culture of Almeria and Murcia, for this has exotic elements which must, I think, have reached this part of Spain by a southerly route, probably a sea route from Sicily, which perhaps followed the North African coast as that which brought the earlier painted pottery to Spain may have done. There are two striking features of the Argaric culture proper which have always excited speculation: namely the practice of burying adults in large jars often inside the houses, but sometimes outside the settlement altogether, and the elegant pottery chalice which is ubiquitous in the south-eastern sites.

It has been pointed out on numerous occasions both by Professor Childe and by Professor Santa Olalla that the rite of adult jar burial both outside and inside settlements is a favourite one in third millennium Anatolia, and that there are also some other features of the early Anatolian cultures which recall El Argar. The chalice, too, is a favourite shape in Anatolia. So far so good; but by what mechanism are we to connect third millennium Anatolian cultures with a culture of the later second millennium in Spain? In his latest publication Professor Santa Olalla suggests a sort of Kon-Tiki expedition fleeing from the wrath of the Hittite King Mursilis II or the effect of the battle of Qadesh.[65] This is an attractive and romantic notion, so that one rather regrets being unable to agree! But the people whose customs were similar to those of the Argaric people were not the Hittites or their contemporaries, but Anatolians of a thousand years earlier, and it was, I believe, a long and gradual process of culture-creep which finally washed up some of their cultural descendants on the shores of South-Eastern Spain. Let us see if we can trace the major steps.

Adult jar burial is known as a rite from several sites in Greece,[66] and it appears in the rich R-graves of Levkas.[67] These graves are labelled "Early Helladic" but objects of Mycenean Shaft-Grave type found in two of them show that these at any rate probably date from as late as the beginning of the 16th century B.C.[68] Chalices are also well known in E. and M. Helladic Greece, and in fact occur in the R-graves themselves. That a more or less continuous movement of groups of people from Western Greece to the Central Mediterranean was taking place during the second millennium B.C. is now becoming relatively well known and documented. Among such groups we may count

[65] *Excavaciones en la ciudad del Bronce Mediterraneo II, de la Bastida de Totana* (*Murcia*), Comisaria General de Excavaciones Arqueológicas, Informes y Memorias, No. 16, p. 157.

[66] E.g. Rakhmani, Tiryns, Asine, etc.

[67] Dorpfeld, *Altithaka*, II, pl. 13. There are both cist and jar burials.

[68] Dorpfeld, *op. cit.*, noted by Childe, *Dawn*, 4th ed., p. 69. Miss Benton, however, doubts the association.

the Piano Quartara and Capo Graziano cultures of Lipari, the Castelluccio culture of Sicily and the Tarxien Cemetery culture of Malta. The Milazzese culture of Lipari appears a little later than these and is substantially the same as that of Thapsos in Sicily. How far it represents a new influx from eastwards, and how far it is a development of the Capo Graziano culture seems still uncertain; but it certainly embodies ultimately eastern traditions.[69]

Among the shapes common in the Milazzese-Thapsos grey wares is the chalice, but it came as a considerable surprise when a few years ago a cemetery of jar burials belonging to this culture was discovered at Milazzo on the coast of Northern Sicily.[70] Previously the only burials of this culture known were those in the rock-cut tombs of the Syracuse district. So then we can trace adult

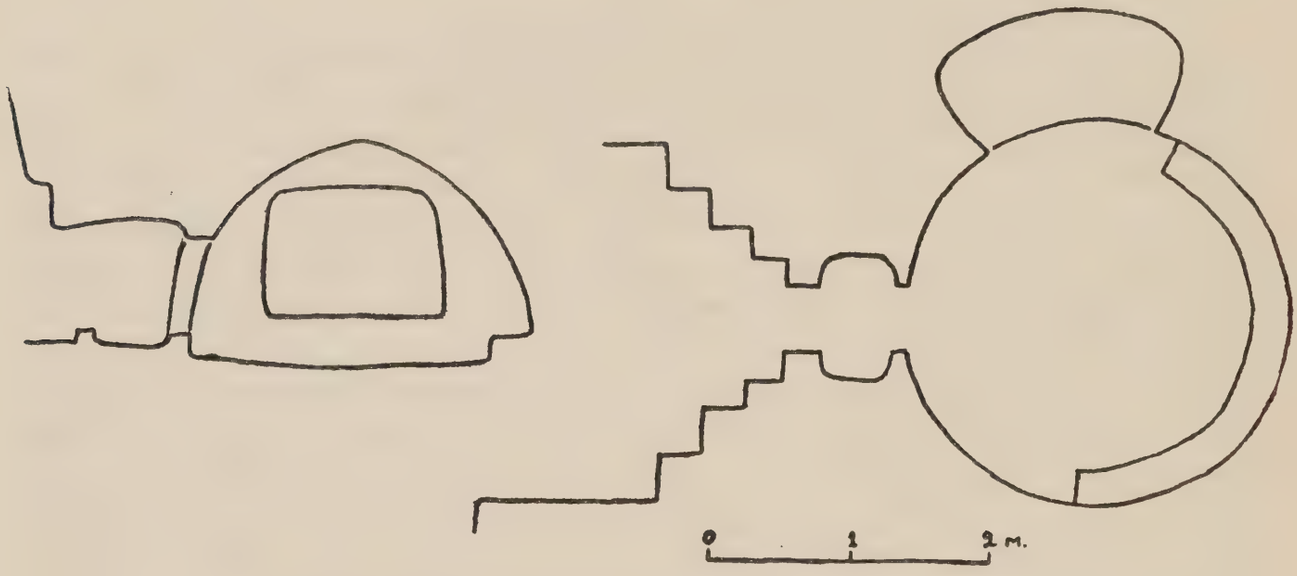


Fig. 4. Tomb 1, Molinello, Sicily (after Orsi)

jar burial (a relatively uncommon rite), from Anatolia through Greece to Sicily, not as an isolated culture-trait, but as part of a movement of groups embodying a similar cultural background. Let us suppose that some of these people followed the coast of North Africa further westward to South-East Spain. This is relatively easy to imagine, since we have some evidence that painted pottery people followed this route earlier. The beginnings of the Milazzese-Thapsos culture belong to the late 16th or 15th century B.C., which would be right for the beginnings of El Argar, so our chronological gap would thus be bridged.

There is one more piece of evidence from Spain that some such movement

[69] Bernabò Brea thinks that it perhaps evolved from Capo Graziano under Minoan/Mycenean influence (*La Sicilia*, etc., p. 186).

[70] Brea and Cavalier, *op. cit.*, p. 55.

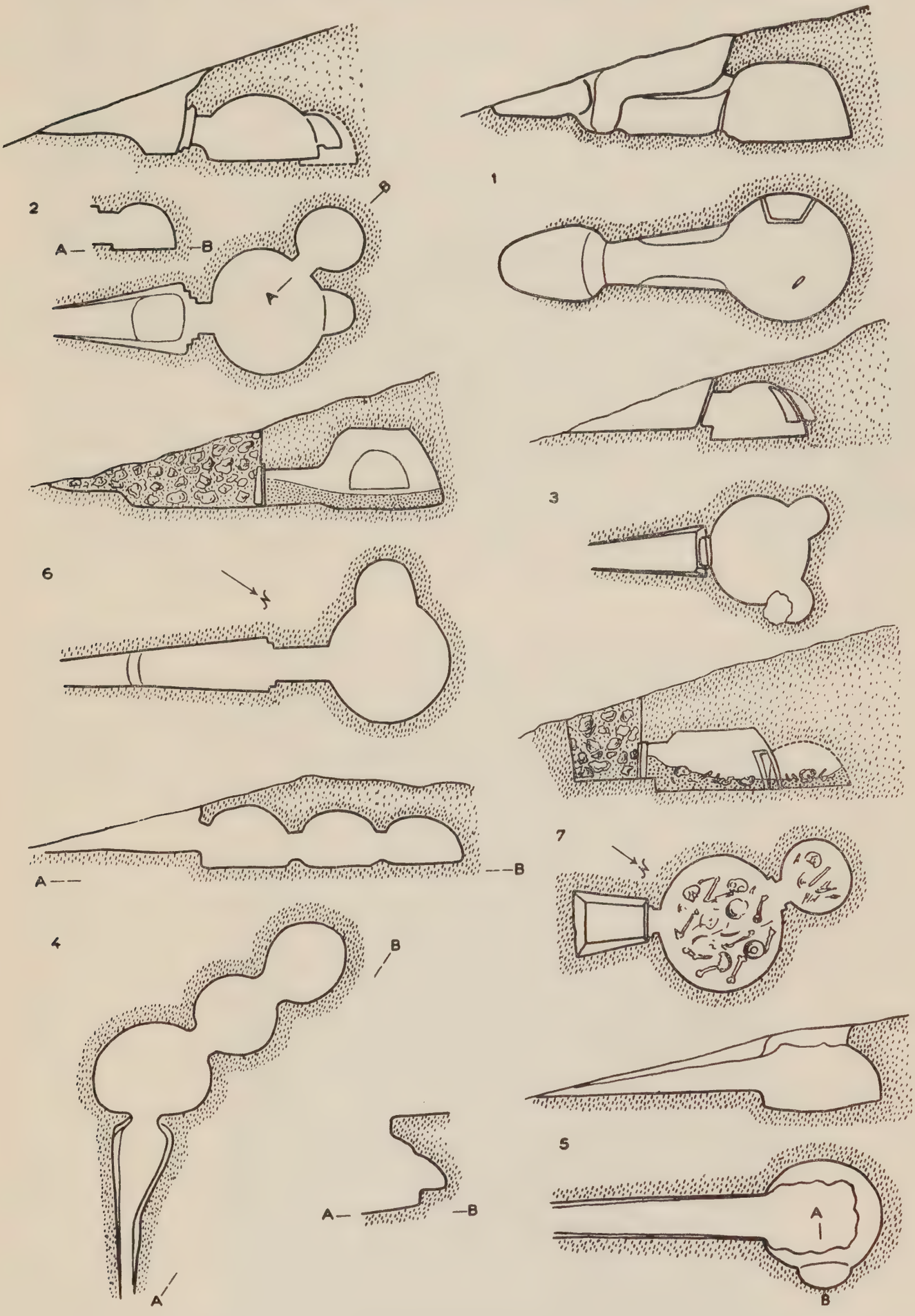


Fig. 5. Tomb plans and sections, Alcaide, Spain. After S. Gimenez Reyna

may have occurred at this time. In the province of Malaga, about 30 miles from Antequera, there was discovered at Alcaide some years ago a necropolis of rock-cut tombs.[71] They have been compared with those of Portugal, e.g. Palmella, Alapraia, etc., and, somewhat vaguely, with those of Sicily.[72] In reality, however, they do not particularly resemble the Portuguese rock-tombs (Pl. I, *b*) or Sicilian tombs of the Castelluccio period, but they have detailed affinities with the tombs of the Thapsos period in South-East Sicily (Pl. III, *a*, *c* and Fig. 4; cp. Pl. III, *b*, *d* and Fig. 5). All the typical features of these tombs, which do not appear in earlier Sicilian rock-tombs, can be paralleled at Alcaide—the entrance pit, the multiple recessed frames for closing slabs, the niches in the walls for offerings,[73] the bench in the chamber, the long straight entrance corridor widening as it approaches the chamber. These tombs had been robbed, but such material as was left in them had strong affinities with that of El Argar. There is absolutely nothing to suggest a relationship with the Palmella culture, and surely it is only the tyranny of fixed ideas which has prevented the admission that we have here a culture related to El Argar using tombs of Sicilian Thapsos type. If as the excavator, Gimenez Reyna, believes,[74] these Alcaide tombs also have affinities with the nearby great tholos of Romeral we have an interesting new reason for dating the large tholoi of Andalucia late and raising the question of direct Mycenean connections. There is Mycenean pottery at Thapsos!

We have now come full circle. If the El Argar culture is the amalgam I believe it to be, it represents the closing of the jaws of a pincer movement by independent groups of cultures belonging to what I have called Group II. It is also the high water mark of this tide of movement from the east, at any rate for the time being, for during the earlier part of the first millennium movements into the lands of the Western Mediterranean came chiefly from Central and Western Europe.

[71] Gimenez Reyna, *Memoria arqueológica de la Prov. de Málaga, hasta 1946*, Informes y Memorias, No. 12, pp. 49 ff.

[72] G. and V. Leisner, *Die Megalithgräber der Iberischen Halbinsel, Der Westen*, Berlin, 1956, p. 38. Also Gimenez Reyna, *op. cit.*, p. 53.

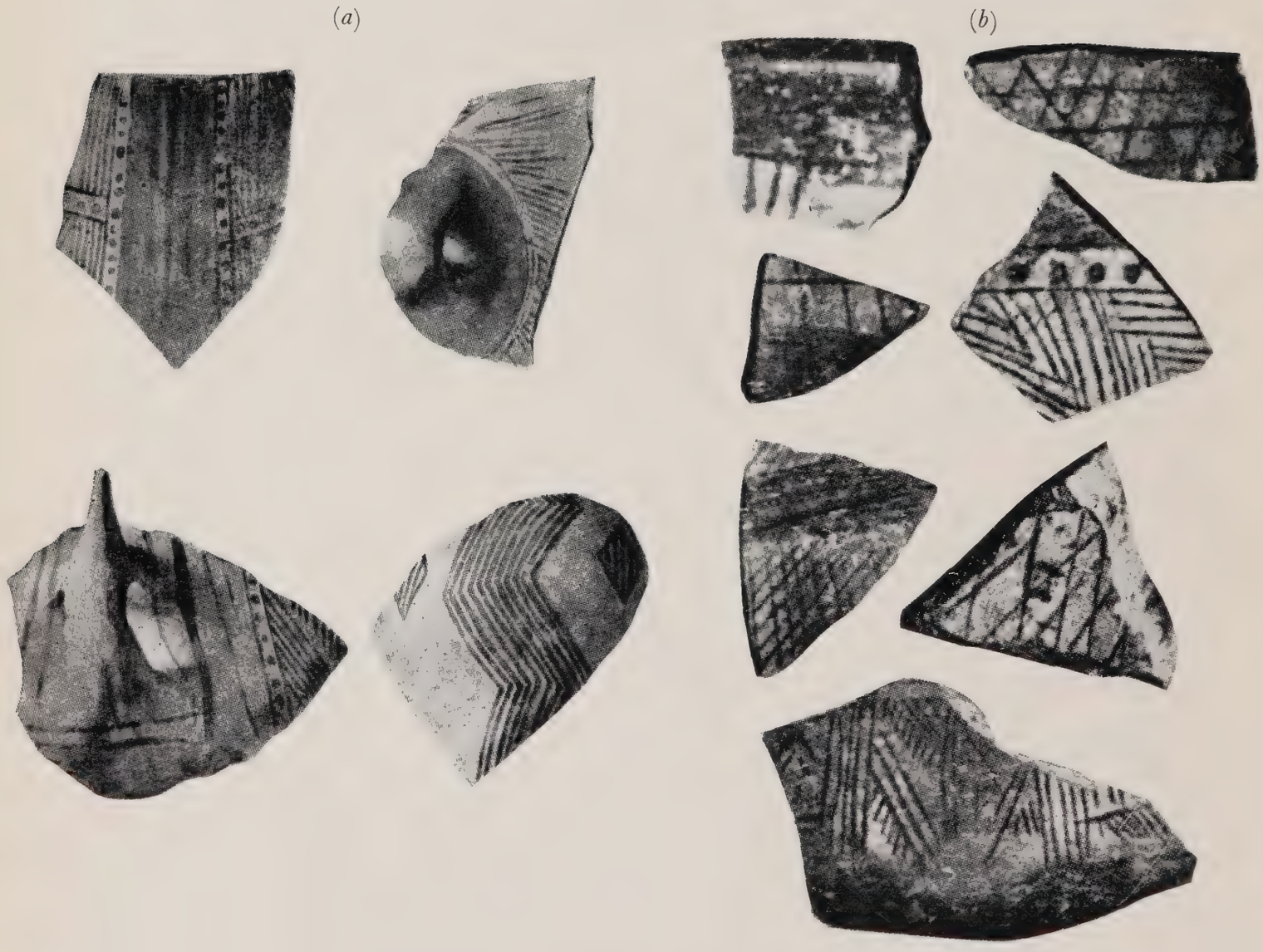
[73] See pl. IV, *a*, and Fig. 4; cp. Fig. 5, Nos. 2, 3, 5, 6.

[74] *Op. cit.*, p. 53.

(*a*) Entrance to Tomb 5, Xemxija, Malta. (Photo Valletta Museum)

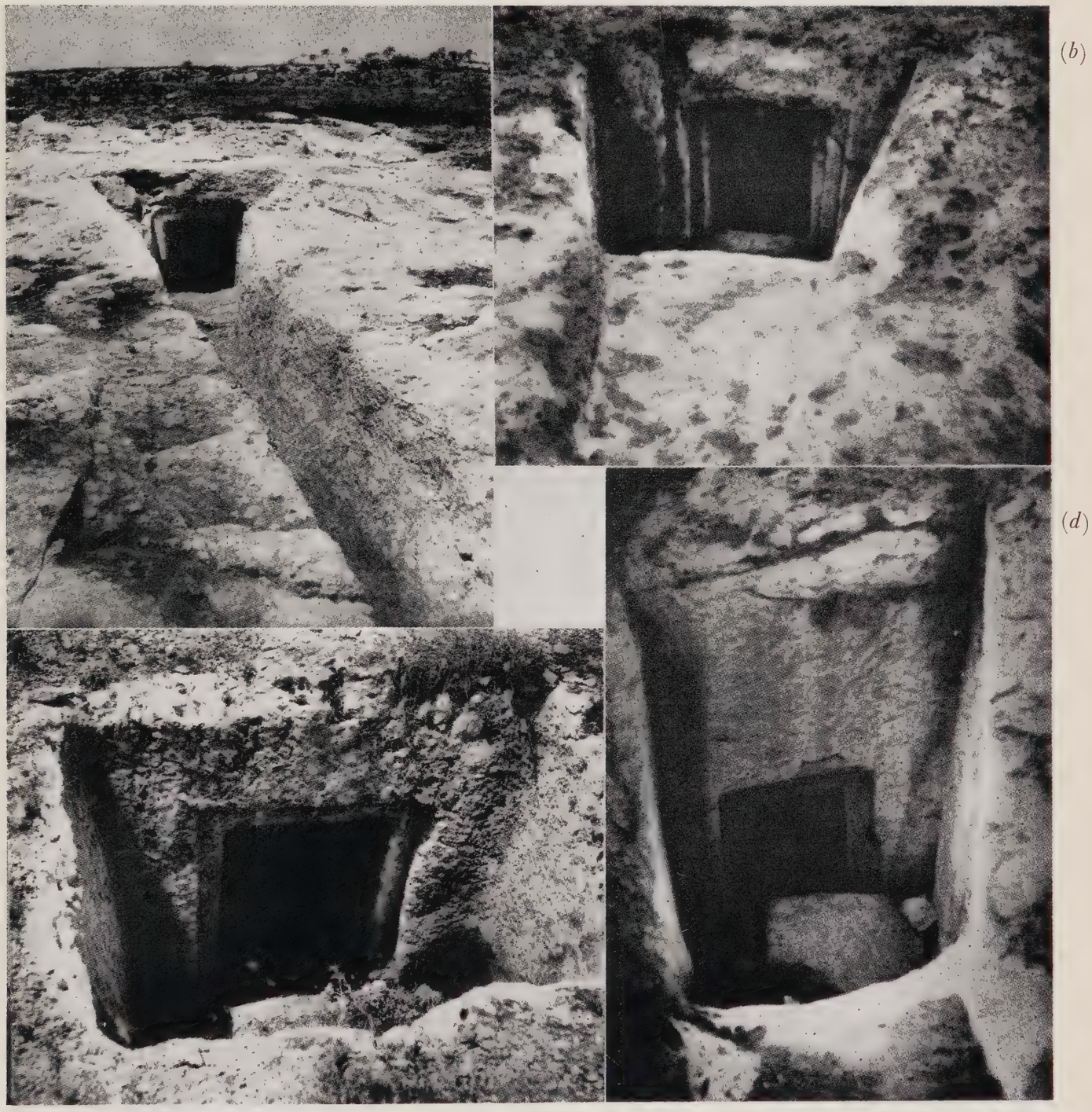
(*b*) Entrance to Tomb 4, Alapraia, Portugal. (After G. and V. Leisner)

PLATE II



(*a*) Sherds from Ripoli, Italy (after Rellini)
(*b*) Sherds from Mesas de Asta, Jerez, Spain (after Santa-Olalla)

PLATE III



Entrances to tombs at Alcaide and Thapsos. (*a*) and (*c*), Thapsos; (*b*) and (*d*), Alcaide ((*b*) and (*d*) after G. and V. Leisner)

(*a*) Thapsos

(*b*) Xemxija (photo Valletta Museum)

Field Treatment of Archaeological Specimens from Nimrûd in Iraq

By Marjorie M. Howard

In the summer of 1955 the writer was invited by Professor Mallowan to take part in the 1956 excavations at Nimrûd, mainly for the purpose of treating and drawing the Nimrûd ivories. The writer would take this opportunity of thanking the Management Committee for the necessary leave of absence, and would also record her grateful thanks to Professor Mallowan and the British School in Iraq for a generous grant towards the expenses of the expedition. The following is a short account of the work undertaken, and the treatment carried out on the ivories and other objects.

For the treatment of the Nimrûd ivories a vacuum impregnator was specially constructed by Mr. Martin Burgess of University College Laboratory. This apparatus, capable of being packed in a comparatively small space, proved invaluable for the impregnation and strengthening of small objects. The medium used was polyvinyl acetate in toluene or methylated spirit, contained in a large bottling jar, the object to be impregnated being immersed in it and the air then evacuated by means of a small hand pump. On restoring atmospheric pressure the polyvinyl acetate is forced into the object, where it fills any cavities. After draining and evaporation of the solvent, the solidified plastic helps to hold the parts together.

The most important ivory found in 1956 was part of a strip in two registers, decorated with an Assyrian procession of victory.

The fragments of this plaque were excavated in very small pieces (the largest being about one and a half inches long), and being unburnt were in a very friable and laminated condition. The earth was carefully removed from each piece with a fine paint brush and a needle point. Drawings were made after exposure of the fragments *in situ* to show the exact position of each. Each group of fragments was then treated with a coating of polyvinyl acetate in toluene. This was allowed to dry and harden, after which the earth was carefully scraped away from underneath the whole area, so that the ivory could be lifted undisturbed on its own block of earth. Each group was laid in position on the corresponding area of the drawing. On arrival at the headquarters hut, the surplus earth was carefully removed, and the ivory placed, uncleaned, in the impregnating vessel. This was repeatedly evacuated and air pressure restored

until the ivory released no more bubbles on evacuation. The ivory was then allowed to stand in an atmosphere saturated with toluene vapour to drain for about twenty-four hours, and finally dried in the open. The finish obtained was thus free from excess of plastic and not shiny. When dry, the pieces of ivory were sufficiently strengthened for the dirt to be removed by acetone applied with a small stencil brush, after which they were examined for joins. Those found were mended with celluloid dissolved in acetone. Gradually figures of marching men, a prince, courtiers and chariots were pieced together, all modelled in high relief with the most minute and careful workmanship. The completed strip, which measured 7 by $3\frac{1}{4}$ inches, was then drawn to scale, as were all the other more important ivories.

One piece of ivory which presented a particular problem, was a small unburnt roundel, which, because of its fragility, had been strengthened with a gauze bandage before lifting. Unfortunately, on removal this bandage tended to take with it the surface of the ivory, which started to laminate, and it was necessary to treat the whole surface with celluloid in acetone before impregnating it. Celluloid not being soluble in toluene, it held the roundel together during impregnation, but did not prevent the penetration of the polyvinyl. On drying, the ivory was sufficiently strengthened to be cleaned with acetone, when a fine engraving of a rampant lion was revealed. The whole piece, however, was badly warped, owing to the presence of a large nail, which passing through the centre, had apparently fastened it to a throne or some other piece of furniture. To remove this nail it was necessary to unstick all the joins and re-assemble the pieces, a delicate operation which, thanks to the strengthening effect of the polyvinyl impregnation, was successfully carried out.

Owing to the discovery of a new set of bronze gates at Balawat, a good deal of metal had to be dealt with. The gates were badly damaged: the site had been ravaged by a conflagration that had left much charred wood and fused or distorted much of the bronze. All the long panels were more or less broken, and most of the annular hoops of bronze which had encircled the gate posts had been crushed or folded in half. The only pieces which still remained in position were those round the bottoms of the wooden door posts, and the bronze edgings to the bottoms of the doors. From these it was possible to establish that one leaf of the door had been open, and the other shut, at the time of the destruction. The open half of the door must, indeed, have been immovable for some time before it was burnt, since the wooden door post was decayed, and had been propped up with stones so that it could not possibly have turned in its socket.

Some of the bronze strips could be lifted without treatment, but most of the pieces were too fragile, and these were therefore strengthened by the application of strips of surgical bandage soaked in celluloid solution. These bandages

held in position any cracked pieces of metal, but since they had of necessity to be applied to the outer or uppermost surface, in many cases this meant that the face of the panel was covered by the bandage. Panels thus covered were later reinforced with a fresh bandage on the back, and the front bandage removed with acetone. An attempt was made to clean the surface of the bronze with a fine point, but the fragments were so friable that all mechanical treatment was discontinued. Before any of the bronzes were removed from the site, a diagram was made of all the pieces as they lay *in situ*, and this was repeated for all the different layers of the deposit, each piece being given a number as it was lifted, corresponding with that on the diagram. When the drawings of the different layers were later put together, it was possible to see roughly how the panels had fallen, and to establish that the bronze decoration had been on the outside of the doors, since no bronze had fallen inside the room behind the closed half of the door, although there was a great pile in the outer doorway, and inside the threshold in front of the open leaf. Most of the woodwork was too charred to be of any value (except for purposes of carbon 14 dating), but parts of the bases of both door posts were obtained intact. The heart-wood of one door post was unburnt, but of a tinder-like consistency, so that it crumbled at a touch. After repeated soakings with polyvinyl acetate, however, it became quite firm and solid, and could be safely packed and brought to the Baghdad Museum.

Two very decayed small circular bronze fittings from Nimrûd, which had presumably decorated a wooden chair- or table-leg, were likewise treated, both before and after lifting, with repeated applications of polyvinyl acetate, and although the bronze was too decayed to be cleaned, it was possible to conserve the shape of the fittings and remove much of the dirt and corrosion.

Sketches and measurements were made of painted wall plaster designs. These were all of a geometrical character, and included one of large petalled circles in black and white, one of pomegranates and daisies in red, blue, black and white, and a small portion of a step design in the same colours. Experiments with different media for the preservation of this plaster were not successful, and it has proved so far impossible to conserve the bright fresh colours, which, when untreated, could be brushed off with a finger touch. No important quantity of the plaster was therefore treated in any way.

A badly shattered, nearly life-size statue of Shalmaneser II was reassembled and partially mended with celluloid, so that the inscription could be roughly cleaned and read, and the general form of the figure ascertained.

A small collection of recent snail fauna was made from a number of places visited in Iraq, and a few specimens were obtained from the ancient deposits at Nimrûd, which included both sea and river species. Perhaps the most interesting conchological acquisition was a number of shells of

Caecilioides acicula, which were found in the wood of the posts of the Balawat gates. This species is not a wood feeder, but is known to live on decaying animal matter. Perhaps oil or fat used to lubricate the gates was the attractive substance in this instance.

Some animal and reptile bones were also collected, both recent and ancient, and although the latter were rather fragmentary, they included a nearly complete antler of *Dama* sp. (fallow deer), now extinct in Iraq. This last was very fragile, but was successfully lifted after several applications of polyvinyl acetate.

Studies and photos were made of recent cattle both in Iraq and in Egypt, and scale drawings and measurements taken of a number of skulls of ancient Egyptian cattle in the Museum of Ancient Agriculture in Cairo.